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ABSTRACT

This report presents the results of a feasibility study of statewide multitype library networking in North Carolina. Potential network functions, products, services, sources, and costs are covered, but questions of network governance, management, and funding are not directly addressed. The report begins with background information and a description of computing and related communications technologies as used in libraries. Reasons for library network failure are discussed as well as the North Carolina library environment. A conceptual framework for North Carolina networking activities is outlined based on networking configurations known as zones of convenience (ZOC's). Also outlined are North Carolina library needs and networking alternatives using the Southeastern Library Network (SOLINET), OCLC, and/or other systems. An economic analysis of library alternatives for cataloging, interlibrary lending, and circulation and other technical processing functions is provided as well as a series of cost models with unit cost figures. These models can be used by individual libraries, groups of libraries, or centralized services to evaluate possible network activities. The report makes 14 recommendations on library networking and delineates implementation activities for the next 5 years. An executive summary, a 20-item bibliography, and two appendices containing supplementary material are provided. (Author/ESR)

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# NORTH CAROLINA LIBRARY NETWORKING FEASIBILITY STUDY

Submitted to

Division of State Library
North Carolina Department
of Cultural Resources
Raleigh, North Carolina

Submitted by

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August 1982

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## EXECUTIVE SUMMARY

This study was initiated to investigate the feasibility of statewide multitype library networking in North Carolina. North Carolina has a very uneven distribution of information resources, ranging from small "information-rich" areas to large areas of relatively sparse information resources. This study was aimed at investigating alternative approaches to achieving a more even distribution of access to those information resources by all residents of the state.

Our approach to multitype library networking in such a variety of local environments was, from the beginning, to avoid the all too common assumption that networking implies computer and telecommunications based networks. Two features were essential to the approach: flexibility and appropriate technology. We did not want to impose a rigid network structure for libraries to conform to, nor to destroy existing cooperative arrangements, nor to employ overly sophisticated technology. The concept that rapidly emerged to allow us to remain flexible was that of 'zone of convenience' or ZOC. A ZOC is defined as a library or group of libraries that can conveniently share resources. ZOCs can form because of geographic proximity, or similarities in types of patrons served, on complementary collections, or existing cooperative relationships, etc. Libraries can be members of more than one ZOC, and can change membership over time, although we anticipate that the ZOCs will eventually stabilize.

The entire project followed an iterative process of information gathering; review, analysis and synthesis; presentation; information gathering, etc. The process resulted in the development of a framework for networking activities which is described in Section 5 of this report; an assessment of the needs of librarians throughout the State; a review of networking and supporting resources available both within the State and outside, and a set of detailed cost analyses of various feasible alternatives. The cost models were designed to be used in the following ways:

(i) by individual libraries to support management decision making relating to the most appropriate mode of networking.

(ii) by groups of libraries to determine how best to share resources.

(iii) by centralized services to analyze their operations and potential clients.

Applying the cost models as closely as possible to the North Carolina environment (some data were not available from North Carolina libraries, so data from other sources were matched as closely as possible to the North Carolina library environment) resulted in a series of recommendations.

The recommendations concentrated on two main sources of support for networking activities: OCLC via SOLINET and integrated library automation systems (ILAS). The use of OCLC was recommended for cataloging and interlibrary loan requesting, and the ILAS for circulation control and the support of an online public access catalog. The way libraries exploit these sources depends largely on their total transaction volumes and mix of transaction types. Alternatives include using a centralized processing service, operating an OCLC terminal in-house, or sharing an OCLC terminal with other libraries. The remaining functions that could be supported by networking are acquisitions and serials control. Both could be supported via either OCLC or an ILAS. The selection should be based on available time with either source, and the differences between the total variable cost for each function.

Finally, the steps necessary to achieve full implementation of networking by North Carolina libraries were set out.

# SECTION 1

# BACKGROUND

## 1.1 Introduction

North Carolina has long viewed its libraries as among the State's primary resources for the enhancement of economic and cultural growth. The State has over 2,500 libraries, which together house over 40,000,000 books, 282,000 serials (titles), and employ more than 7,000 FTE staff. The sharing of library resources has a distinguished history in North Carolina.

The coordination of cooperative development among various types of libraries was specifically assigned to the Department of Cultural Resources (Division of State Library) by the 1977 session of the North Carolina General Assembly (G.S. 125-2, Subdivision 10). The legislation also provided guidance in how this responsibility was to be met, stating that "cooperative library development should be based on the sound foundation of current successful programs, that it should be the product of a joint effort representing the needs of all libraries, and that the emphasis should be on planning and coordination of a decentralized system rather than an attempt to centralize or bureaucratize the State's cooperative effort." [1]

In 1977, the State Library appointed representatives from all types of libraries to an Ad Hoc Committee on Multitype Library Cooperation. This committee joined with the NCLA Networking Committee in 1979. A Technical Subcommittee was formed in early 1981. As a result of the work of these committees, the State Library has contracted with King Research, Inc., to study the feasibility of establishing and operating a statewide library network for North Carolina by identifying the potential functions of such a network, the products and services to be derived from it, and the probable costs of the appropriate network approaches. The purposes of the study are:

1. To assist the library community in arriving at a consensus on the functions, priorities, and structure of a statewide network.

2. To identify the potential benefits of a statewide library network as a basis for making recommendations to the Governor and to the General Assembly.

3. To propose a realistic incremental plan of action, identifying steps to be taken prior to actual network structure and design.

A statewide library network for North Carolina could take many forms and could provide many possible combinations of services and products. The decisions on which form to adopt and which services and products to initiate will be founded on the expressed needs and preferences of members of the library community across the State.

## 1.2 KRI Networking Approach

Our approach to investigating the feasibility of multitype library networking in North Carolina was, from the start of the project, to avoid the often-made assumption that networking implies computer and telecommunications-based networks. Rather, we wanted to approach the study with open minds in considering:

(1) What could multitype library networking achieve in North Carolina?

(2) How could the network be established to ensure that those achievements could be met?

Libraries in North Carolina are actively engaged in networking (both computer-supported and not), and considerable time and effort (as well as other direct costs) have been invested in establishing such activities. Our approach evolved into building on these existing activities and arrangements as far as possible in order that the original participants and others within the state (and eventually outside the state as well) could recoup greater benefits.

There are two features essential to our approach. The first of these is *flexibility*. It rapidly became apparent, through our discussions with librarians

across the state, that a rigid, very formal network structure would not be acceptable to the majority of librarians for a variety of reasons (the most common being an inherent resistance to any formal, inflexible, seemingly imposed structures). This attitude was particularly prominent in small libraries. A flexible approach to networking that would be responsive to the needs of libraries of different types and size, etc., is much more likely to be accepted and implemented. We have attempted to outline such an approach (see Section 5) in order that networking activities can flourish within the state as and when needed. With a flexible structure, library networking activities can develop at different rates depending on the level of sophistication required. In this way, no group of networking participants need feel constrained to wait until all libraries in the state are actively involved in networking, nor need any group feel that they are unable to participate in some way.

The second feature essential to our approach is *appropriate technology*. We felt that this was necessary to allay fears that a sophisticated computing and telecommunications network would be set up, requiring expensive equipment and high telecommunications costs to access it. We have been very careful, therefore, to consider various access alternatives that might be used by individual libraries. These alternatives include, using a centralized processing service, sharing terminals (dedicated OCLC or dial-up), or owning a terminal (dedicated OCLC or dial-up). The optimum economic choice of alternative for each library is dependent on volume of activity.

In Section 7 of this report, we discuss alternatives for networking activities and in Section 8, we derive a series of cost models that individual libraries, or groups of libraries, can use to make decisions on the appropriate level and extent of their involvement in statewide networking.

Given the wide range of libraries in North Carolina from small school libraries to large academic libraries, from urban libraries to rural libraries, etc., we feel that the approach we have adopted for North Carolina is the most appropriate for all potential participants. In addition, we anticipate that the current economic climate will promote this type of approach in the future. This study was initiated at a time when significant changes are taking place in library

related activities. North Carolina has an opportunity to move ahead, taking full advantage of new technologies, to build up networking structures and activities more relevant in today's changing environment.

## 1.3 Library Networking in North Carolina

The libraries of North Carolina are appropriately regarded as among the state's primary resources. A brief overview of the history and present status of these libraries and of the cooperative arrangements among them provides a basis for conducting a study to determine the feasibility of a statewide library network, a network which would make most effective use of appropriate new technology and available library resources to better meet the information needs of all citizens of the state.

North Carolina has more than two and a half thousand libraries, which together house over 40,000,000 books, 282,000 serials (titles), and employ more than 7,000 FTE staff [2]. Among the types of libraries, there are more school libraries than other types (2,035). Distribution of other types is as follows: [1]

357 public
138 special
65 community college system and private junior college
50 college and university

Resource sharing has a distinguished history in North Carolina. As far back as 1935, cooperative arrangements existed between the University of North Carolina at Chapel Hill and Duke University [3]. The North Carolina Union Catalog had its beginnings in this period also. The coordination of cooperative development among various types of libraries was specifically assigned to the Department of Cultural Resources by the 1977 session of the North Carolina General Assembly [1].

Many cooperative programs and networks presently exist in North Carolina. They encompass a wide variety of functions, have varying degrees of formalization, employ a variety of networking technologies, and serve a wide range of users and libraries. Among the most significant of such programs are:

(1) The North Carolina Union Catalog and the Interlibrary Services Network/In-WATS;

(2) The Triangle Research Libraries Network;

(3) The Department of Community Colleges Media Processing Services;

(4) Public Library Automation and Cooperation ventures;

(5) The Department of Public Instruction 16mm Film Computerized Catalog; and

(6) Union Lists of Serials.

At least 50 libraries in North Carolina belong to SOLINET/OCLC, giving them access to the more than seven million records of libraries across the country [1].

The same legislation that designated responsibility for the coordination of library cooperation in 1977 (G.S. 125-2, subdivision 10) wisely stipulated that cooperative library development should be based on the foundation provided by currently successful programs such as those listed above.

In addition to the broad experience of library cooperation reflected in the existence of the above noted efforts, there appears to be support for the continuation and expansion of such activities, both from the libraries and from the public. The state long range plan for library service states as an objective:

> "To coordinate the resources and services available from all types of libraries and to endorse their interdependence for the most economical use consistent with retaining primary responsibilities and resources of individual libraries, both public and private." [4]

The North Carolina Governor's Conference in 1978 drafted 29 resolutions pertaining to library services, nearly all of which at least implied resource sharing [1].

It would be unrealistic to assume that general support for the concept of resource sharing can be translated easily into consensus about what the functions and services of a statewide network should be. The 1977 library cooperation coordination legislation referred to earlier mandates that cooperative library development be "a joint effort representing the needs of all libraries" [1]. However, there are some significant barriers to cooperation which must be dealt with realistically. For example, for special libraries to participate in a statewide network there must be a resolution of the issue of public funding benefiting the profit-making sector [5].

Developing consensus among potential participants in and clients for a statewide network as to which functions are most desired, most appropriate, and technologically and economically feasible is a challenging task. It is, however, the appropriate step at this time.

## 1.4 Objectives, Outcomes and Limitations of the Study

The major purpose for conducting the study was to consider the feasibility of establishing and operating a statewide library network for North Carolina by identifying the potential functions of such a network, the products and services to be derived from it, and the probable costs of appropriate network approaches.

Overall, the purposes of this study are to:

- Facilitate the achievement by the library community in North Carolina of a consensus on the functions, priorities, and structure of a statewide network.

- Identify the potential benefits of a statewide library network in terms relevant to the interests of the Governor and the General Assembly.

- Recommend an incremental plan of action, outlining steps to be taken prior to actual network structure and design.

The study was originally organized into seven tasks, and one further task was added approximately mid-way through. The tasks were:

Task 1. Conduct General Assessment of Needs

Task 2. Investigate Potential Services Available from SOLINET

Task 3. Determine and Evaluate Technical Requirements of Network

Task 4. Develop Two or More Feasible Approaches

Task 5. Compare Benefits and Costs

Task 6. Identify Implementation Steps

Task 7. Recommend One Approach

Additional Task Investigate the Technical Feasibility of Continuing Development of the Public Library Networking Plan

Task 1. Conduct General Assessment of Needs.

In this task, we conducted extensive consultations with key persons throughout the state, held hearings, and gathered relevant experience from across the country. We developed a matrix of functions, services, and products and employed state-relevant criteria in assigning priorities for action/implementation.

Task 2. Investigate Potential Services Available from SOLINET.

This investigation included an on-site visit, continual monitoring of the dynamic situation at SOLINET, and made recommendations on ways to relate the network activities to SOLINET.

Task 3. Determine and Evaluate Technical Requirements of Network.

In this task, we reviewed potential applications, strategies, and sources in terms of network requirements for North Carolina.

Task 4. Develop Two or More Feasible Approaches.

Using the results of the previous three tasks, we described alternative approaches to networking that would respond to the needs and opportunities identified in Task 1.

Task 5. Compare Benefits and Costs.

The relative benefits and costs of the alternative approaches were analyzed. This analysis not only supports economic feasibility decisions, but is also critical to increasing political feasibility and acceptability of recommendations.

Task 6. Identify Implementation Steps.

In this task, we outlined plans for each of the alternative approaches. These plans indicate the incremental steps that will lead to the achievement of each approach in North Carolina.

Task 7. Recommend One Approach.

In this task, we considered each alternative in isolation and in combination with other alternatives, from the standpoint of specified criteria, and of technical, economic and political feasibility. This resulted in a series of recommendations for networking activities which were addressed to all libraries within the state.

Additional Task. Investigate Technical Feasibility of Continuing Development of the Public Library Networking Plan.

This task involved visits to both sites in North Carolina which had systems implemented according to the plan, to other libraries using the same vendor system, and interaction with vendor representatives. Recommendations were made concerning the future of the plan and its incorporation into the multitype library networking activities addressed in this study.

The outcome of the study is a Final Report which presents the results of the study including descriptions of potential network functions, products, services, sources; development of alternative approaches to statewide networking activities; economic analysis of alternatives; recommendations; and implementation plans. KRI's approach to the study was to concentrate on a "bottom-up" view of library networking and, consequently, we developed a series of cost models that can be employed by individual libraries (or groups of libraries) for making decisions about the type and extent of involvement in statewide networking activities. These models are described in detail in the Final Report.

The study was restricted to technical and economic issues relating to networking. In particular, the study was not to address, in any direct sense, questions of governance, management and funding. Nor was it to undertake actual design of the network. The scope of the study reported herein was strictly one of feasibility.

## SECTION 2
## USE OF TECHNOLOGY IN LIBRARIES

### 2.1 Introduction

With the rapid development of microelectronic technologies and the subsequent falling costs of hardware, a considerable amount of computing power is now within reach of many organizations previously unable to afford equipment. All but the very large libraries have until recently been unable to even consider automation. The trends in use of technology for the support of library operations, collection management, etc. have been from the application of large, general purpose mainframe computers to small, dedicated minicomputers and, more recently, microcomputers. The libraries that had access to large mainframe computers usually had to share the computer resources with other types of applications, such as accounting, payroll, inventory, etc. Unfortunately, this resulted in libraries receiving low priority at certain times, the consequence of which was a tendency to distrust automation for library applications.

The most successful application of mainframe computers to library applications was with cooperatives of libraries, where the machine was dedicated to supporting their operation. This was how the OCLC* network emerged. Originally, a cooperative of nine Ohio libraries using a centralized mainframe computer to produce catalog cards, OCLC is now a major international cataloging utility supporting shared cataloging, catalog production, acquisitions and some serials control (more details of OCLC services can be found on page 90).

There have been two evolving types of capabilities based on computing technologies (both hardware and software) and related communications technologies. They are:

- bibliographic services or utilities
- library automation systems.

Each of the two types has a role to play in changing library environments. Rather than compete, the two are mutually supportive and complementary, although the boundaries between them are blurring. The bibliographic services have traditionally

*Online Computer Library Center, formerly Ohio Colleges Library Center.

supported shared cataloging and catalog production but have begun to move into other areas, such as acquisitions, serials control and interlibrary loan. The library automation systems support the functions of circulation, catalog access and maintenance, serials control, acquisitions and management reporting. When first introduced into libraries, minicomputer-based systems were dedicated to a single function as a stand-alone (self-contained) system. Today, systems are being developed which combine many of the different functions. The systems of the future will be fully integrated systems, the concept of which is displayed in Figure 2.1. A truly integrated system implies that information to be stored is only input once even though it is used in many ways, and that system-wide functions such as monitoring, authorization control, indexing, sorting and searching are implemented only once.

The way in which librarians interact with the two types of capabilities is similar. In both cases, some form of computer terminal is used. This could be a dumb or intelligent terminal, or a microcomputer. Access to the bibliographic services (or network services) is always via remote telecommunications links (usually a telephone connection-dial up or dedicated), whereas access to a local integrated library automation system can be via a hard wire link direct to the computer as well. This latter set-up is only feasible for short distance communications (up to about 5 miles), so a more remote library will have to use a telecommunications link.

There are currently three large bibliographic utilities in the U.S.: OCLC, RLIN (operated by the Association of Research Libraries) and WLN (the Washington Library Network).

There are three broad classes of alternatives available to North Carolina libraries to automate their activities other than shared cataloging. These three alternative classes are to:

1. Acquire and install a centralized minicomputer package.
2. Acquire and install a centralized mainframe computer package.
3. Carry out in-house development of special-purpose software.

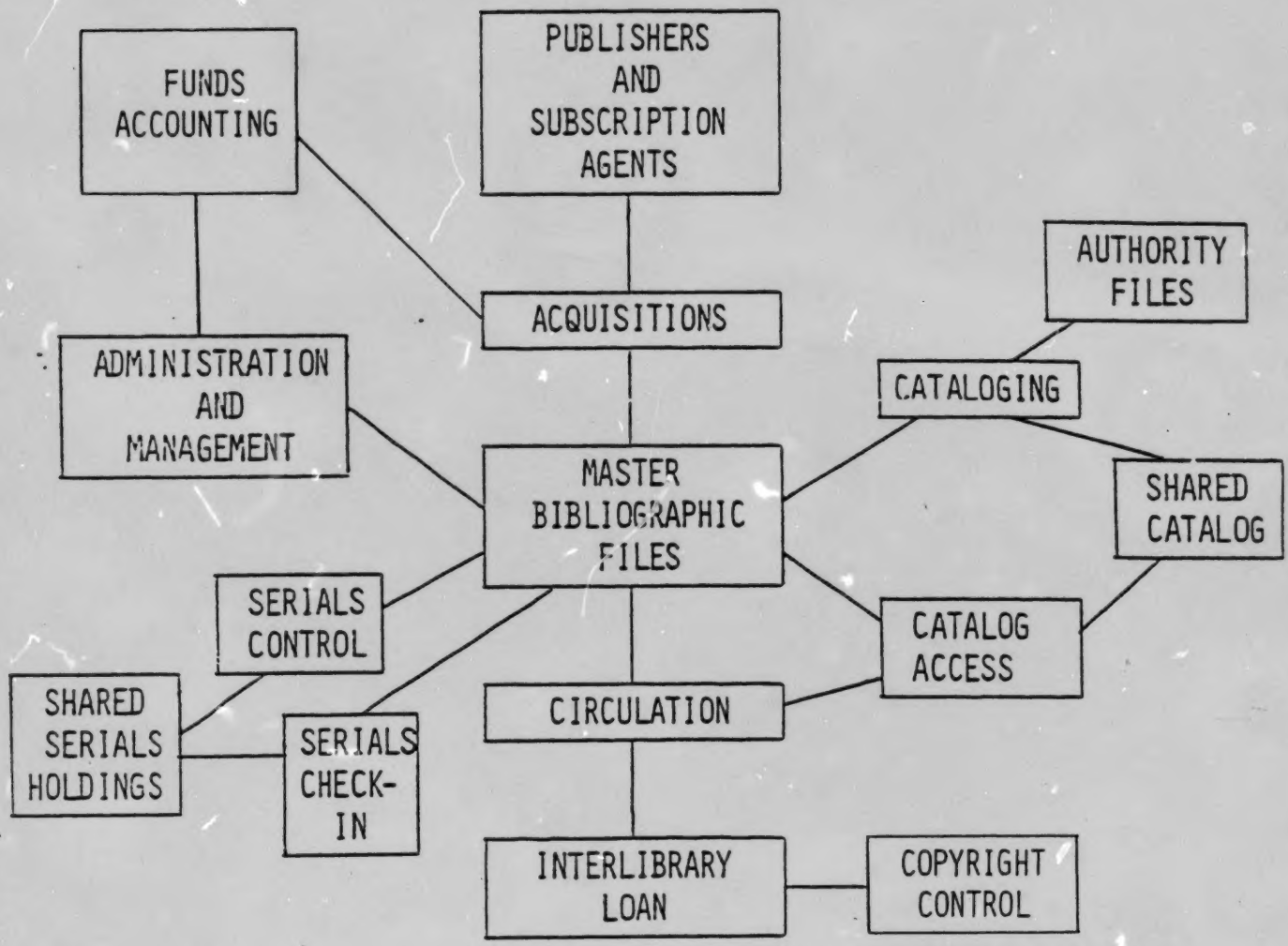


Figure 2-1.

INTEGRATED LIBRARY AUTOMATION SYSTEM

The remainder of this section describes each of the alternatives in terms of the considered current state-of-the-art, and their implications for automated library networking activities in North Carolina.*

## 2.2 Minicomputer Packages

Minicomputers, introduced during the early 1960's, were initially developed as low-cost digital computers with a minimum of processing power, memory, and software support. However, it was soon recognized that minis had a potential use in a number of unrelated areas and that they should be adaptable to the requirements of each. This resulted in the development of a number of general purpose minicomputers with separate software. Prior to these developments, machines were sold for specific applications with software provided as part of the overall system package.

There are three major factors responsible for the minicomputer's spread into the more general application areas of library automation, accounting, etc.:

- Evolution of more sophisticated operating systems in the late 1960's to early 1970's. These were disk based, real time, and timesharing.

- Emergence of peripherals (printers, terminals, large disks) with the same flexible environmental specifications as the minicomputers.

- Dramatic reduction in price, weight, physical size, and power consumption as a result of higher levels of integration in circuitry.

There are two main ways in which minicomputer-based systems are being used in libraries. The most widespread way is as a turnkey system. Such an approach delivers a machine that can handle clerical functions in circulation control, acquisitions, and technical processing. These turnkey systems are complementary to network services and can be combined with the cataloging and database networks to

*This does not mean that we will consider only automated library networking for North Carolina - but potential for computer and telecommunications support for networking is the focus of this section.

create very effective and economical "total" systems for individual libraries. The alternative approach involves using minicomputers to provide an in-the-library computing facility. In such an approach the minicomputer serves as a replacement for the large-scale computer traditionally used in system development and operations. The software for such systems is usually developed either by in-house programmers or by a software house, to serve one function at a time.

Library automation packages are available as discrete systems serving a single function, for example, circulation control, or as systems serving multiple functions, for example, cataloging, and acquisition. Although the ultimate goal of some of the vendors is to produce a fully integrated system serving all library functions, no such system is close to completion. (We can expect, in the next year or two, to see systems covering some aspects of all major library functions, but full integration of all functions is 5-10 years away.)

Based on the material collected, the following library functions and associated capabilities are currently supported by vendors of minicomputer-based software:

- Acquisitions
  - pre-order searching
  - ordering
  - claiming
  - cancelling
  - receiving
  - routing
  - management reports
  - vendor and fund accounts
  - financial reports
  - vendor-independence (can order items from several vendors)

- Cataloging
  - full MARC formatting
  - interfaces with OCLC, RLIN, etc.
  - real time maintenance
  - Boolean searching both within and across files
  - production of labels
  - item-in-process retrieval

- The Catalog
  - online catalog query by
    - subject
    - author
    - title
    - L.C. card number
    - ISBN/ISSN

- Circulation
  - borrower registration
  - borrower status
  - check-in
  - check-out
  - item status by author, title, call number, LC card number, ISBN/ISSN vendor number, subject
  - reserves
  - overdue notices
  - reserve notices
  - recall notices
  - fines notices
  - management reports

- Serials
  - ordering
  - invoice control
  - serials check-in
  - claiming
  - binding control

Each of the functions listed above exists as part of vendor-supplied turnkey packages. However, the packages that are evolving in the direction of "totally integrated" systems have these capabilities to varying degrees. There are about a dozen vendors today who offer a multi-function turnkey system (predominantly cataloging and circulation), and they are discussed in more detail in Section 7.1.

The turnkey system vendor, in addition to supplying the system, provides a number of services to the client. The installation and on-site testing of the system is completely handled by the vendor, as in maintenance. Vendors specializing in special purpose systems, such as library automation, will often provide superior maintenance services (e.g., faster response time) than either a mainframe vendor servicing general purpose systems, or an in-house maintenance group which may have to service a range of systems. Many vendors now have the capability to provide remote diagnostic services. Using a dial-in port to the system, diagnostic software can be run remotely and solutions found very quickly. In some cases, the client is advised to purchase, with the system, a complete set of spare parts (circuit boards, etc.) so that a diagnosis of a faulty board can be remedied by simply replacing it.

The vendor-supplied software will also be maintained. New software (updated versions of existing modules as well as new modules) will be issued (at very low cost) often as frequently as twice yearly. These updates (releases) will often require clients to compromise particularly in the area of operational procedures. The vendors will develop software that will satisfy the majority of clients and organizations with special needs may have to compromise more than others.

One of the problems of acquiring a turnkey system, particularly one that is attempting to integrate functions, is vendor lock-in. The more integrated the system function the more dependent the client is on the vendor. The investment in system acquisition, data input and conversion (where applicable) make it extremely costly to move to another system in the future.

## 2.3 Mainframe Computer Packages

Mainframes differ from minicomputers in that they are large, general purpose machines. Until very recently, the software available for mainframes (operating systems, database management systems, etc.) was by far superior to any minicomputer software. This situation is changing rapidly especially with the larger minicomputers (VAX, PRIME 750, etc.). Because of the general-purpose rationale underlying the development of mainframes and because of the expense of the mainframe systems, they have not traditionally been used as the basis for

library applications. The few exceptions are those organizations which already had a mainframe computer serving multiple functions (accounting, research, etc.).

Based on the material collected, the following library functions and associated capabilities are currently supported by vendors of mainframe-based software:

- Acquisitions
  - pre-order searching
  - ordering
  - claiming
  - cancelling
  - receiving
  - routing
  - management reports
  - vendor & fund accounts
  - financial reports
  - vendor's independence
  - documents indexed by vendor, library fund, order number, document number, author, title, subject
  - standing orders (subscriptions)
  - item-in-process file

- Catalog
  - full MARC-compatible catalog
  - OCLC/RLIN interface
  - real time maintenance
  - Boolean searching
  - authority files
  - library networking with local holdings files indexed by call number
  - built-in procedures combined with integrated authority files help catch errors

- Catalog production
  - COM production

catalog cards
book labels
specialized bibliographies

- The Catalog
  - online catalog query by
    - author
    - title
    - subject
    - classification number
    - publisher
    - ISBN/ISSN
    - LC card number
    - local call number
    - series
  - Boolean searching
  - keyword searching
  - truncation of search values

- Circulation
  - borrower registration
  - borrower status
  - check-in
  - check-out
  - circulation of all types of materials
  - item status indexed by borrower name, borrower number, document number, call number, author, title, keyword in title
  - reserves
  - recall notices
  - fines notices
  - interlibrary loan
  - management reports

- Serials
  - holdings information
    - recording
    - online access
    - COM or paper output

On the whole, these packages are considerably more integrated than available minicomputer-based packages. They are based on the concept of master bibliographic files accessed by the various functional subsystems.

The vendor-client relationship in the case of a mainframe computer is considerably different from the minicomputer environment. This difference is primarily caused by the general-purpose nature of the mainframe. The vendor will maintain communication with the computer center personnel but is unlikely to have any contact with the various groups of users of the machine. Consequently, the vendor is unlikely to develop the library automation package as a priority -- or to customize it for individual libraries. The key priorities for the vendor tend to be the maintenance and development of the operating system and system utilities.

## 2.4 In-House Developments

A library automation package developed in-house can be designed to run on either a minicomputer or a mainframe, and so the capabilities described in the two preceding sections could be included here. The major difference between those two alternatives and the in-house development lies in the cost of bringing a system to full operation. As will be discussed later in Section 7, the costs of developing a fully integrated library automation package are extremely high (of the order of hundreds of many years of programming efforts). The advantages of in-house development include the tailoring of software to meet the exact procedural requirements of the library system for which it is designed.

The support and upkeep of the system is also different from that accompanying a vendor-supplied package. The resources for support and maintenance must be found in-house. If the system is mounted on a timeshared mainframe, the library may find itself fighting for shared resources and may not be given a high priority within the organization. The ideal solution to this problem would be

for the library to maintain a full-time systems specialist dedicated to maintain library related software, but once again the cost is usually prohibitive.

## 2.5 Microcomputer Applications

Although they have only been available over the last few years, microcomputers are finding uses in almost all functional divisions in libraries. A number of projects are in progress but very few of them have been formally documented. At the recent ALA (American Library Association) meeting in Philadelphia (July 1982), a number of commercially available microcomputer-based library application packages were exhibited.

### Commercially available systems

The MINI-MARC system of Informatics, Inc. uses a 16-bit microcomputer (Computer Automation LSI-220) with floppy disk storage. The system provides full MARC bibliographic records with a database consisting of 500 floppy disks. Records can be displayed, modified, and transferred to a blank floppy disk to build custom catalogues. This system has been used to produce abbreviated catalogue records for use with a CLSI LIBS 100 circulation system. The system costs about $50,000.

Futura Computer Products, Inc. have produced a microcomputer-based circulation system. The system is designed for easy use with screen prompts. A bar code wand captures patron identification and the code is then displayed for confirmation. A manual override option is also available. Futura will write custom overdue and recall notices as well as various management reports. The Futura Library Circulation System has been written using the latest version of the CP/M operating system by Digital Research. As new releases of CP/M become available, Futura will be in a position to upgrade the system. Three system sizes are currently available with 5 inch, 8 inch or hard disk storage. The system costs about $15,000 at the lower end and about $30,000 at the top end of the range.

Ringgold Management Systems, Inc. have produced the Nonesuch Circulation System which has been implemented to operate on a wide range of computers, from mainframe to microcomputer. The system was designed and developed by librarians and retains the characteristics of simplicity, reliability and low cost. All software is written in COBOL. The current configuration consists of a 64 K byte microcomputer with a hard (10 M byte) disk and floppy disks (700 K byte). This configuration is capable of controlling approximately 50,000 titles and patrons and costs $29,000.

CTI have produced two microcomputer-based library packages. They run on either an Apple II or the more sophisticated Microdata computer. The package contains the following functional modules: total circulation, catalogue production, keyword title search, acquisition, audio visual booking and serials control.

Non-commercial systems

The majority of microcomputer-based library applications have been small in-house developments which remain formally undocumented. A recent UNESCO report [6] reviewed many of those projects. The predominant application areas for microcomputers were:

- catalogue production
- bulletin production
- circulation
- acquisitions and serials
- reference and data management systems
- administration
- online searching
- communications
- education and training

Illustrative examples of each of the above category have been selected and the following descriptions are by no means comprehensive.

## Catalogue production

A word processor (BDP 90-02) has been used successfully at the South East Thames Regional Library and Information Service (in U.K.), a co-operative of fourteen libraries, for catalogue card production. When a new book is ordered by one of the libraries, a check is made to see if it has already been recorded in the word processor and stored on floppy disk. Each disk holds about 150 titles. Details of books acquired by member libraries are submitted to the main centre and entered into the system which manipulates the records to automatically produce the required number of catalogue cards in the desired format.

On a smaller scale, the Glendora (California) Public Library is using a Radio Shack TRS-80 to enter cataloguing-in-progress (CIP) data for the production of catalogue cards. It is reported to be using the system to keep track of book orders and plans to add a circulation overdue system.

## Bulletin production

Abstracting and indexing bulletins have been produced on minicomputers for some while now, but today low cost microcomputers are achieving the same results. The facilities available on such systems include: input, editing, sorting, searching, index card production, generation of special topic bulletins, monthly updates, cumulations and output formatting.

The Information Services Division of the University of Tulsa uses a 32K-byte Altair 8800b microcomputer to input, edit and print the bulletin "Petroleum Abstracts". The Editorial Processing System (EPS) is a microcomputer system that combines word processing and data processing. Once the bulletin entries are input to the system they can be used for the generation of author indexes and bibliographic lists, and the records are transmitted to the University's full scale computer for archival storage and retrospective retrieval. Before this system was introduced, the bulletin was manually typed on variable-spacing typewriters. With such a process the abstracts were retyped at least once before finally appearing in the bulletin. They also had to be sorted by hand for inclusion in the bulletin.

The implementation of the system at the start of 1978 revealed a number of initial problems (such as the effect of static discharges and power fluctuations). These were solved readily without causing delays in the production schedule. The most serious failures were due to unfamiliarity of personnel with the operating procedures. The final system configuration consisted of two Altair 8800b micros each with 48 K bytes of main memory, two Altair 300 K byte floppy disk drives, two Diabolo printers and two Data General 6053 terminals. The total cost of hardware and software was in the region of $30,000.

## Circulation

The Oakridge (Oregon) Public Library reports the use of a low cost (under $3,000) 8-bit microcomputer (Ohio Scientific, Inc. C2-8PDF) for a circulation system. This illustrates one area of future impact for microcomputers in libraries, particularly for small libraries.

Another circulation system using a microcomputer has been developed by Cincinnati Electronics Corporation. This is a stand-alone system that operates in an online interactive mode. This system, like the one at Oakridge, is an absence file or transaction recording system (only items that are issued are kept in the computer file) that requires much less storage than an inventory system.

Microcomputers can also be used as front end interfaces between the librarian or user and a large computer system. The Decicom, Inc. circulation system developed for the Nassau County (New York) Public Libraries is an example of this approach. A 16-bit micro is used in this system and transactions are stored on tape for batch processing on a mainframe.

## Acquisitions and Serials

One example of a microcomputer being used for acquisitions work is the TRS-80 system that keeps track of book orders at Glendora Public Library (see section on catalogue production).

The problem of serials control is complex but some microcomputer-based solutions are beginning to appear. G. Lundeen of the Graduate School of Library

Studies at the University of Hawaii has written a journal routing slip program that runs on a Radio Shack TRS-80 Model I.

CLASS (California Library Automation Systems and Services) also uses a TRS-80 Model II microcomputer for its serials control system, Checkmate. The system functions include check-in, claiming, routing, accounting, production of title and subject lists and subscription expiration alert reports. Special features of the system include:

- keyword searching using Boolean operators
- sophisticated command language and field modification techniques
- flexibility to accommodate individual needs
- variable length records
- automatic file scan to locate late or missing issues
- prompted data entry
- user-selectable record printing formats
- user-defined indexing
- built-in stop word list which is user modifiable
- MARC-like or user-defined field tags
- addition and deletion of temporary notes to any field
- file security.

Currently using floppy disks, the system provides access to 2,000 records. However, future development of the system will incorporate a hard disk capability which is planned to support up to 6,000 records.

Reference and data management systems

REFLES (Reference Librarian Enhancement Systems) is an online microcomputer-based system initially designed for handling in-house data files in a library reference department. The system, developed at the UCLA Graduate School of Library and Information Science, is now a generalized prototype software package housed in an inexpensive readily available microcomputer - the TRS-80. The system development philosophy was to enable the capturing of data which do not exist in

printed sources, which are essentially inaccessible, and which are in need of frequent updating. In effect, REFLES functions as a "group scratch pad".

REFLES I was designed to be utilized in a library environment where it could enhance library reference service by providing quick, efficient, and relatively easy access to information and data stored in an in-house database. The major limitation of the system was the storage capacity of a single floppy disk (20 logical records of 40 lines of data). Consequently, REFLES I was adapted and modified to become a more generalized software package, REFLES 2, for the purpose of developing individualized databases in a number of environments. The adaptation is currently mounted on an Alpha Micro 100.

The University of North Carolina at Greensboro is using microcomputers in connection with the development of a Children's Media Database. Using a Processor Technology Sol 20 (costing about $3,500) with the ELECTRIC PENCIL text editor, lists of periodicals indexed by such basic access tools as Education Index, Current Index to Journals in Education, and Library Literature were keyboarded. Each list was then run through a program which posted an abbreviated code for the indexing service (EI, LL, CIJE) at the end of each citation. The three lists are then merged to eliminate duplicates. Then, additional occurrences of periodicals already in the database are noted, e.g., Social Science Citation Index, PAIS, Wilson Indexes, Psychological Abstracts, etc. The end result is the publication of a "Guide to Indexed Periodicals in Education".

A second project relating to the microcomputer is concerned with a table of contents service in criminal justice. A by-product of this project is the publication of an "International Guide to Periodicals in Criminal Justice" which is entirely microcomputer-produced and contains a list of indexing and abstracting services, a basic list of periodicals in alphabetical order, with periodicity, publisher information, and an indication of indexing and abstracting coverage.

Administration

There are several microcomputer applications that would help in performing administrative functions, including word processing, reporting, and fund accounting.

Word processing packages for microcomputers are now available with fairly sophisticated capabilities. Those sell for about $100 to $200 and allow editing, formatted printing, automatic page numbering, footnote and index generation, right justified margins, and so on. The real appeal of these systems is the ease with which one can revise textual material once it has been typed. Changes are made very easily, and successive drafts can be produced automatically; only the alterations require manual input. Libraries produce many kinds of typewritten documents (correspondance, memos, reading lists and bibliographies, guides, etc.) that could be done with a word processing package running on a microcomputer with a good quality printing terminal.

Online searching

All microcomputers with the standard RS 232 communications interface can be used as simple terminals to search remote databases using a telephone connection and a modem. This type of operation, however, does not fully exploit the potential of the microcomputer for retrieval. There are two ways that microcomputers can be used for online retrieval: as pre-processors and post-processors.

As pre-processors, microcomputers perform various operations prior to the user's interactions with a remote database. Today, there are vast numbers of machine-readable data bases available for online searching from many different vendors. Often, the command languages and the command syntaxes, although similar, differ from system to system [ 7 ]. The various command sets and rules for using the systems could be stored in a microcomputer and recalled by the user immediately before going online. Long character sequences required for logging-in to various systems could be stored in the same way and initiated from a single function key on the keyboard to accomplish automatic logging-in. Complex search strategies which will be used frequently can be handled in a similar way.

As post-processors, microcomputers are used to manipulate records that have been retrieved from databases. Records can be reformatted and merged to produce reports. Indexes can be automatically generated from the retrieved record set. Bibliographic Retrieval Services (BRS) in Scotia, New York, have recently

made a microcomputer-based terminal available to their users. This microcomputer, called the PDS I, is connected to the BRS computer system as though it were a "dumb" terminal. However, records that are retrieved from the database may be stored locally and re-accessed by the user.

Communications

A number of computer networks are being developed for the microcomputer user:

Digicast, like teletext, will transmit words and pictures over broadcast waves in a steady stream. The Digicast transmission will include news, financial data, real estate listings, classified advertisements, weather forecasts, computer programs and library resources. To receive the service, users need a modified personal computer with a radio receiver. As in teletext, the computer will "retrieve" only those items which it has been programmed to catch.

PCNET (Personal Computer Network) is an electronic mail system for Commodore PET personal computer users over telephone connections. To use the system, PET owners need a modem and the PCNET programs (costing about 8 U.S. dollars).

The Source is the first home terminal consumer information network put on the market in the U.S.A., and probably the most ambitious. People with home terminals can call for specific information including any UPI article over the last 7 years (newspaper articles), computer programs, video games and airline information. In addition, the Source offers electronic mail to other terminals and for $0.75 a computer message becomes a telegram transmitted to O'Hare airport in Chicago. All transmissions are over Telenet (a private data communications cable network), and service is limited to off-business hours and weekends when network charges are cheaper. To use the system a personal computer or data terminal plus modem and telephone connection are required, and the service costs $2.75 per hour.

An alternative to broadcast media, the Community Memory Project was initiated in the San Francisco area for public management of public information.

The system is a network of small computers with large memories, each connected to 10 or 20 computer terminals located in public places (such as libraries, shops, community centres, etc.). The network is used as an electronic bulletin board. The project is interesting in that it is one of the few systems that does not require people to own a terminal or microcomputer to use it.

Education and training

Probably the greatest potential use of small scale computing equipment is in education and training of library and information professionals, and of users of library and information services.

Library instruction generally takes two forms - library orientation and formal instruction. The primary purpose of orientation is the introduction of a particular library and its resources to new users. It attempts to inform the user about location of materials and equipment, physical organization and other facilities that are provided. Formal instruction, on the other hand, consists of courses that offer instruction on information organization, retrieval and management. Computer-aided instruction (CAI) can be used for both types of instruction. There are, in fact, many advantages to using CAI over tours, lectures, audiovisuals and other methods of instruction.

Several libraries in North Carolina currently own, or are planning to own, microcomputers. In a recent survey (July 6, 1982), 28 out of 206 responding libraries were found to own microcomputers, and 17 were planning to do so. The most common micros were the Apple (14) and the Radio Shack TRS-80 (11). Microcomputers are expected to play an increasingly important role in library operations and their potential role in supporting the networking activities in North Carolina must be considered.

## SECTION 3

## WHY DO LIBRARY NETWORKS FAIL?

In planning any large scale networking activities such as those discussed in this report, it is probably worth considering the potential trouble-spots that could inhibit their establishment and/or growth. Two studies have been conducted in this area: one investigating the causes of library network failure, the other investigating factors that inhibit or encourage interlibrary loan activities in a network environment.

### 3.1 Causes of Library Network Failure

Wilson [8] in a recent study of 20 library networks that were no longer operational identified five problem areas:

- lack of adequate funding
- absorption by larger networks
- loosely structured governance
- partial termination of services
- networks programmed for short durations

#### Lack of Adequate Funding

This is the most frequently cited cause of network termination. Many of the respondents did not specify why the funding ceased or where the source of funds originated. However, it seemed as though most were funded either through special grants from the Federal government or through endowments from large corporations.

An example of this is the Technical Educational Consortium, Inc. (TEC) which was established by IBM and Honeywell for the training of technicians for the computer industry, both here in the U.S. and abroad. Funding and computing resources were provided by the two corporations, but when IBM decided that it

could no longer afford to supply the computers (and no longer had a problem locating trained technicians) the network ceased to function.

Absorption by Larger Networks

Networks are often absorbed by larger networks for one of two reasons. The first is that larger networks frequently provide improved services at lower cost. The second is that recent advances in new technology facilitate access to a variety of other systems. The Captain Library Services Corp. (a network comprising libraries of Princeton and Rutgers Universities) falls into this category. The organization found that OCLC provided the same services as they did, at lesser cost.

Loosely Structured Governance

A third cause of network termination is the lack of formal governance. The New River Valley Library Consortium in Virginia was described by its former director as "a loose and barely formal group of academic and public library directors who sought and failed to find a common ground of concerns."

Partial Termination of Services

This category of failure relates to the discontinuation of some of the services provided by the network sometimes, but not always, to be replaced by an alternative service. An example is the Western Interstate Commission for Higher Education Program which was discontinued and replaced by the Western Interstate Library Coordinating Organization.

Networks Programmed for Short Durations

This category dealt with networks that were set up for short time periods only and were primarily experimental in nature. These networks may have been very successful, for example Talinet and Salinet funded by the U.S. Department of Health, Education and Welfare, but ceased all activity after funds expired.

## 3.2 Factors Influencing ILL Activities

A second study, by Russell [9], focused on factors inhibiting and encouraging interlibrary loan activities in the PALINET* network. Inhibiting factors included:

- mix of bibliographic utilities serving participants
- different means for transmitting requests
- lack of comprehensive policy
- poor delivery service
- costs

Encouraging features identified were:

- increasing numbers of OCLC library and ILL users
- expansion of the OCLC online catalog
- alternative delivery methods

### Mix of Bibliographic Utilities Serving Participants

This was considered to be the prime inhibiting factor for successful interlibrary loan activities within PALINET. Well over 90 percent of libraries in the region do not subscribe to any bibliographic utility. Of those that do, 97 percent participate in OCLC and 3 percent in RLIN. A number of those RLIN libraries were originally OCLC members with significant holdings (over 90,000 items added in 1 year), which are no longer available to the majority of area libraries, since very few other libraries have search accounts on RLIN.

### Different Means for Transmitting Requests

A variety of transmission means are used for interlibrary loan activities. Even libraries in the same network (OCLC, RLIN) use different means.

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*Pennslyvania Area Library Network

Among PALINET's OCLC members about 61 percent use the OCLC ILL subsystem, and approximately 50 percent of the special libraries use it. Other libraries use mail, TWX or telephone for request placement.

Lack of Comprehensive Policy

The multi-state, multi-interest nature of PALINET means that its members sometimes operate under different policies. Within the area there are at least three ILL codes and a number of other agreements among groups of libraries. Recently, a PALINET Interlibrary Loan Task Force considered the question of whether PALINET should set up its own code. The consensus was that, at the present time, the addition of yet another code would not alleviate the situation but would rather confuse it further.

Poor Delivery Service

The lack of comprehensive delivery service is considered a major obstacle to successful resource sharing in any network. The recent adoption of high speed ILL request placement via telecommunications has highlighted the slow speed of traditional modes of delivery. Within PALINET, libraries rely entirely on the mail service for delivery of requested items.

Costs

Costs are considered a serious barrier to ILL. This has become increasingly so with the introduction of new techniques for ILL, such as the OCLC ILL subsystem, because of the seemingly high visible, up-front cost (e.g., the OCLC fee of $1.20 per transaction). This makes the cost of newer forms of service seem more expensive than traditional, often slower, methods.

Increasing Numbers of OCLC Library and ILL Users

The primary factor enhancing interlibrary loan in the PALINET area is considered to be the growth and development of the PALINET network itself,

particularly in terms of expanding OCLC membership. The most recent trend (which we at KRI feel will be the predominant trend in the future) is the growth in the number of smaller libraries joining OCLC. Not only are new members subscribing to the cataloging services but also for the ILL subsystem. This does not mean a total switch from other methods, rather libraries are beginning to integrate OCLC with TWX and mail. However, the preferred mode is the OCLC subsystem largely because of its ability to refer an unfilled request sequentially to up to five libraries.

Yet another encouraging factor is the recent agreement between OCLC and RLIN which allows the RLIN members searching privileges on OCLC in return for magnetic tapes of their cataloging activity, which will make information about the holdings of those libraries available to OCLC members (and vice versa).

Expansion of the OCLC Online Catalog

The growth and development of the OCLC online catalog benefits both members and nonmembers. The OCLC database grows at a rate of about one million records every nine months. Within PALINET, it has been observed that many new libraries joining the network find all of their holdings have already been cataloged in OCLC. The union list capability enables both members and nonmembers to maintain summary holdings of journal titles.

Alternative Delivery Methods

In the state of Pennsylvania, an alternative document delivery method exists: the Interlibrary Delivery Service (IDS). The service was funded jointly by LSCA and membership fees and is considered the largest statewide delivery service in the U.S. Overnight delivery is achieved through a contract with Purolator. This speedy backup of ILL requesting has done much to encourage ILL among its 121 members.

North Carolina libraries have an opportunity to learn from the experiences of other networking attempts and care should be taken to avoid some of the barriers to networking activities which could seriously deter future cooperative efforts within the state.

SECTION 4

# THE NORTH CAROLINA LIBRARY ENVIRONMENT

## 4.1 Libraries in North Carolina

The state of North Carolina is extremely varied in terms of geography, economics and culture. The state can be divided into five areas, each distinct from the other, which have entirely different characteristics. The five areas are (1) the mountains in the west; (2) the textile area further east, (3) the Triangle area with its established academic and research institutions and recent influx of high technology industry; (4) the agricultural belt; and (5) the coastal area. The center of the state around the Triangle area is fairly densely populated, whereas the outer reaches of the state are sparsely populated. The populations of each of the areas differ in terms of level of education, information habits and information needs, and consequently, libraries in the state are of equal variety.

In developing statewide networking plans, it is essential to bear this variety in mind. It is important to view such diversity of needs and service requirements as an advantage. The variation in collections across the state enriches the information resources of the state. It is difficult to envisage a single approach to networking that could involve all types of libraries within the state. Nevertheless, that is our aim and this report discusses a flexible networking approach which we feel is capable of application throughout the state.

## 4.2 Current Cooperative Activities

Libraries in North Carolina are engaged in a wide range of cooperative activities, both computer-supported and not. In this subsection, we cover only the non-automated cooperative activities, and in Section 4.3, we cover the automated applications. The areas of cooperation range from reciprocal borrowing and on-site photocopying agreements to interlibrary loan. Many of these arrangements are informal and not documented. Some of the more prominent cooperative ventures are described in a recent report [1].

The North Carolina Union Catalog (NCUC) and the Interlibrary Services Network/In-WATS. Begun in the 1930's, the North Carolina Union Catalog is the oldest example of formal library cooperation in North Carolina. It now has approximately 4,040,000 entries from public, academic, community college, and special libraries. It is predominantly nonfiction, has few children's books, and no documents or theses. Its only access is through main entry (author). Cards for North Carolina libraries on SOLINET/OCLC are no longer filed, except for items cataloged manually. It is available to all libraries in the state through the Interlibrary Services Network, and it is available on microfilm through 1976. As books are lost and not replaced, the union catalog experiences diminishing returns for purposes of interlibrary loan, although it continues to be an important retrospective file. The Interlibrary Services Network/In-WATS service at the State Library employs a staff of 15, including four professional reference librarians, to use the NCUC, SOLINET/OCLC, and the State Library's collection to respond to information requests from across the state.

The North Carolina Information Network, with its toll-free In-WATS service to the State Library, filled 48,000 requests for information in 1978-79. Over 20,000 of these were filled from the State Library's collection, making the State Library the largest single supplier of interlibrary loans in the state. The remaining requests were redirected to holding libraries identified through the North Carolina Union Catalog, which is housed at the State Library, and through SOLINET/OCLC, the online Southeastern Library Network, which provides access to library holdings throughout the southeast and the nation.

North Carolina State University was the second largest supplier of interlibrary loans in North Carolina, although it ranks third among academic libraries in terms of its collection. It is the only North Carolina SOLINET/OCLC member which has made significant progress toward retrospectively converting its holdings to machine-readable form on the network, thus increasing access to its collection.

Medical Libraries supply more interlibrary loans than any other type of special library. They have the only organized type-of-library network in North Carolina, the Area Health Education Centers, which are dedicated to supplying the information needs of health professionals across the state. They also have a union list of serials and of audiovisual materials. And the North Carolina Union List

of Biomedical Serials (NORCUL), maintained by Duke University Medical Center Library, provides access to medical library journal collections in special libraries as well as in university medical school libraries.

A considerable amount of cooperation exists between libraries in the Research Triangle area, with the three large academic institutions heavily supporting the information needs of the companies and institutions in the area, many of which were attracted to the Triangle development because of the excellent library resources that are available.

Further activities on a smaller scale include sharing of acquisitions lists, locally organized joint staff training efforts, local union lists of serials and audio-visual materials, joint use of commercially available online retrieval systems, and locally organized meetings of librarians to share ideas and suggestions. The spirit of cooperation is a tradition in North Carolina and care should be taken not to destroy current activities in an attempt to impose some degree of formalization.

## 4.3 Current Automation Activities

Many of the librarians in North Carolina have automated, or are planning to automate, certain library functions such as cataloging, acquisitions, circulation, and serials control. The future goals of several of these automation activities are the support of COM or online catalogs. The automation projects vary considerably in size, level of sophistication, functions automated, hardware and software used, and so on. Considerable time, effort and cost have been invested in these projects and we feel it is important in assessing the feasibility of various approaches to networking across the state that we incorporate as much of the existing automation activity as appropriate without restricting an optimum networking solution.

A recent survey conducted by the State Library gathered information about the range and extent of automation activities in North Carolina libraries. The results are summarized in Figure 4-1. Over 60 libraries in the State make use of the OCLC network (through SOLINET). Another survey just completed

by the State Library (July 1982) investigated the use, and/or planned use, of microcomputers in libraries across the state. The results of this survey are summarized in Figure 4-2 below.

| Function | Academic | Public | Other | Total |
|---|---|---|---|---|
| Acquisitions | 9 | 2 | 2 | 13 |
| Catalog Use and/or Maintenance | 12 | 7 | 7 | 26 |
| Circulation | 3 | 2 | 3 | 7 |
| Interlibrary Loan | 14 | 1 | 7 | 22 |
| Serials Operations | 16 | 1 | 6 | 23 |
| Reference | 21 | - | 21 | 42 |
| Miscellaneous | 6 | 1 | 2 | 9 |

Figure 4-1. Types of Libraries Using Some Form of Automation

| | Academic | Public | Special | Total |
|---|---|---|---|---|
| Currently Own | 8 | 9 | 10 | 27 |
| Plan to Purchase | 8 | 5 | 4 | 17 |

Figure 4-2. Microcomputers in North Carolina Libraries

The following automation projects were considered significant for future development for cooperative library networking in the state [1]:

- Triangle Research Libraries Network (TRLN)
- Department of Community Colleges Media Processing Services
- Public Library Automation
- Department of Public Instruction Computerized 16mm Film Catalogs
- Various automated serials union list projects.

Triangle Research Libraries Network (TRLN)

The Triangle Research Libraries Network (TRLN) was initiated in 1979 to develop online access through remote computer terminals to the holdings of each of the Triangle Area Libraries - Duke University, North Carolina State University, and the University of North Carolina at Chapel Hill. Ultimately, the three interconnected catalogs will form a local distributed network designed to operate in conjunction with a national bibliographic utility, and could become a prototype for many libraries located close to each other, who need to use all the local collections as a unified resource. The longstanding collection development agreements among the three triangle libraries have been successful in directing collection growth such that the redundant development of in-depth research collections has been avoided. These agreements, together with those relating to the courier service, free photocopying and reciprocal borrowing provided a strong motivation for the TRLN endeavor. The primary reason for this is that although existing cooperative measures resulted in efficient *physical access*, the effective use of the three collections as a single resource could not be achieved without effective *logical access* to the collections.

The TRLN project is based on the recommendations of the Triangle University Libraries Cooperation Committee (TULCC) and two consultants. The report recommends that coordination of collection growth go beyond the definition of concentration (i.e., macro-level collection development) to title-by-title coordination in some subject areas, and that coordination of acquisitions be supplemented by coordination of weeding and preservation programs. Full bibliographic access to the three collections is fundamental to refined collection development coordination at this level. A local bibliographic network would enhance access to materials in the collections by providing remote access to users and by extending the range of materials available in the collections through resource coordination and sharing.

The two consultants (Ritvars Bregzis, University of Toronto, and John Knapp, Ringgold Management Systems) were asked to recommend a plan for the joint

development (by the three institutions) of bibliographic access systems. The consultants were asked to take into consideration the obligation of the Triangle University libraries to not only serve their affiliated constituents, but also nonaffiliated constituents in Research Triangle Park and the fourteen other campuses of the University of North Carolina system.

Bregzis and Knapp recommended that a computer and telecommunications-based bibliographic system be established in each of the Triangle University libraries as the core of a bibliographic access network. They recommended that the network, TRLN, consist of three mini-computer systems, one located at each library, linked by telecommunications facilities, using identical operating systems and telecommunications software, and compatible applications software. Each library would provide access for its users through an online catalog which in turn would interconnect with the online catalogs of the other two libraries. Users in the Research Triangle Park and others throughout the state would then have access to all three catalogs through dial access. The basic premise of the recommendation was that small computer technology has reached the point in terms of telecommunications capabilities, processing power, and storage capacity that direct user services can be delivered most effectively through local networks which draw their data and conduct bibliographic processing through national utilities.

Bregzis and Knapp point out that the development of a local network is conceptually consistent with the national bibliographic utilities and the emerging National Library Network. An effective national network will consist of a combination of national shared data bases and locally maintained users services. The three libraries will continue to contribute bibliographic data to a utility and draw data from the utility. Data of strictly local usefulness will be maintained locally and made accessible to users in a manner that will facilitate direct access to the collections.

The objectives of the first three years (October 1979–October 1982) have been focused on establishing the structure and organization of the project, developing and implementing compatible standards for local holdings data, writing

systems specifications, coding software for base maintenance systems, intermediate and long-range technical planning, the acquisition of equipment, the development of COM catalog production systems as an interim means of providing bibliographic access to the collections, the design of the systems architecture of the online catalog, and the beginning of coding of the online catalog access system. The project was on schedule, as of January 1982, and it is expected that the following systems will be in place by October 1982.

(1) Archive tape processing system for creating and updating master data bases for each library from OCLC Archive tapes (operational).

(2) COM production system (operational).

(3) Online editing system for online maintenance and updating of network data base (operational).

(4) Systems architecture for user access online catalog (substantially completed).

(5) Coding of online catalog system (in process).

TRLN has acquired a Tandem T16 computer and peripheral equipment, storage capacity and operating system software sufficient to develop, test, and operate a prototype online catalog. In October 1982, the hardware, the automated data base maintenance systems, and the functional design of the online catalog will be in place, together providing the foundation for the completion of the online catalog. The phase of the project beginning in October 1982 will thus be the final implementation stage of a project based on extensive groundwork and existing resources.

The TRLN online catalog is perceived as having three primary modules, each of which provides maintenance and access functions for one of the following types of data:

(1) Bibliographic data: descriptions of particular titles, including the access points associated with that title.

(2) Holdings data: information detailing specifically what physical items the library owns, where the items are located, and other information related to specific physical pieces or locations.

(3) Authority data: information concerning valid and invalid headings that are required to provide access to the bibliographic descriptions.

The modules will be closely linked such that each type of data will be accessible both directly and indirectly through one of the other modules. Thus, for example, a bibliographic record could be retrieved directly and from it the associated holdings record could be retrieved. The modular structure of the system will only be apparent to users when necessary to meet user needs.

The system will be developed in a phased manner in order that system services can be implemented and made available at the earliest possible time. The project will allow the Triangle University Libraries to develop and fully implement an operational online catalog by the end of the second year. Linking of the catalogs to form the network in each TRLN library will continue beyond this period.

The planned schedule for development of the bibliographic access system is shown in Figure 4-1. By the end of the first year, the maintenance functions of the bibliographic and holdings modules will be operational and the link between the two modules will be in place. During the second year, the maintenance functions of the authority module will be implemented, and standard access to all three types of data will be operational. Thus, an online catalog will be in place at the end of the second year. Development of more sophisticated access methods such as use of Boolean operators to combine search arguments and the use of certain data elements, e.g., date or country of publication, to restrict searches will be approaching completion. In addition, a separate instructional

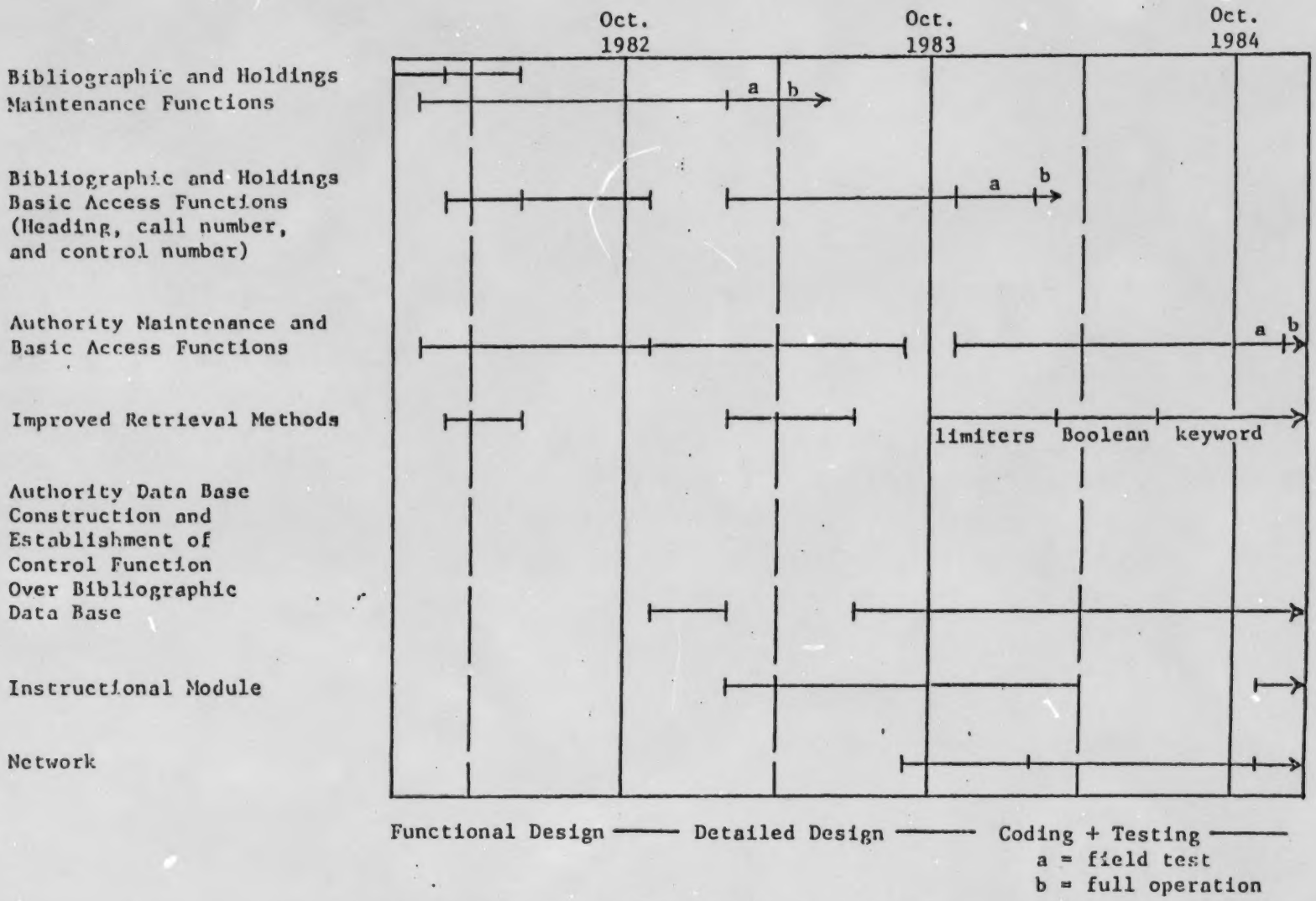



Figure 4-3. TRLN Bibliographic Access System Development Schedule

module will be developed during the second year to supplement the prompting modes of the bibliographic access system itself. Thus, at the end of the two-year period the TRLN libraries anticipate reaching their goal of developing a fully functional online catalog for public use.

There is a tendency in networking to confuse the network organization with the physical network itself, and TRLN is no exception (in fact, this is true of OCLC as well). On the one hand, TRLN is a network *organization* which was established to create and operate a computer network providing "logical access" to the collections of the three universities' libraries mentioned above. On the other hand, the *physical network* (computer hardware, software and communications components) is also known as TRLN. In our view, the definitions are not mutually exclusive; they are "two sides of the same coin." TRLN as a network organization falls into our definition of a ZOC. The TRLN online catalog will provide logical access to the holdings of members of the ZOC, and physical access is provided by an interagency local transportation service. Our recommendations (see Section 9) include the setting up of other ZOCs throughout the state which would co-exist with TRLN.

The physical network is being designed and implemented in-house by TRLN. We discuss the relative advantages and disadvantages of in-house software development versus vendor software procurement on page 20. Based on that discussion and on our review of current vendor software developments, we consider vendor system procurement more appropriate for the majority of libraries in the state than in-house developments. (See also Section 7 and 8 for more background.)

Department of Community Colleges Media Processing Services

This section in the Department of Community Colleges processes approximately 73,000 books and audiovisuals annually for the 57 community/technical colleges and institutes. It is funded through the Department. An automation task force appointed by the Department and an administrative analysis conducted by state government recommended automation of the processing center via

SOLINET/OCLC. This will bring the entire system into the network. One possible difficulty is that current plans are to use a SOLINET "clustering" arrangement whereby each library will be assigned only a partially unique symbol which is not visible on the SOLINET/OCLC terminal. This means that until a microform or online catalog can be produced, the libraries will need to continue to submit cards to the North Carolina Union Catalog in order to participate in interlibrary loan.

Public Library Automation and Cooperation

At least five public libraries have retrospectively converted their holdings to machine-readable form in MARC format through vendors, are converting through SOLINET/OCLC, and others are ready to convert through vendors and are committed to producing machine-readable files compatible with SOLINET/OCLC. All major public libraries have been encouraged by the State Library to join SOLINET/OCLC: three of the five largest public libraries now belong. Two of these libraries are interfacing DataPhase circulation control systems with SOLINET/OCLC as part of the Public Library Networking Plan. The State Library Processing Center processes over 117,000 volumes annually for public library systems across the state. Unlike the community college system, it is self-supporting with the exception of seven state-supported positions. Due to lack of funds, there are no current plans to automate the Processing Center through SOLINET/OCLC, but the Center now catalogs all materials in standard format to make it easier for libraries to retrospectively convert their holdings through a vendor.

Department of Public Instruction 16mm Film Computerized Catalog.

This master computerized printed catalog of systemwide film holdings represents not only an important listing of one of the major resources of school library/media centers, but also a proven mechanism for developing wider union audiovisual lists. The Department of Community Colleges is currently using the programs to create a union list of Community/Technical College and Institute audiovisual holdings.

Union List of Serials

The State Library survey identified eight of these in the state. Most were local; some were statewide. The uncoordinated proliferation of these on the local level indicates the possible need for a statewide list.

Finally, a visit was made to the North Carolina Department of Administration, Division of Computer Center, to determine whether they could support library networking activities. The Division concentrates on supporting automated systems on its IBM 370/168 mainframe but does not support the in-house development of software on a large scale. Nor do they have much space to house a complete system dedicated to library operations.

In conclusion, it appears that libraries in North Carolina have made a good start in laying some of the foundation for statewide networking activities. The majority of libraries involved in the automation projects are large, and careful attention must be given to the potential involvement of the smaller libraries within the state.

## 4.4 Communications Capabilities

The communications facilities in North Carolina constitute potentially the most serious drawback to the future of library networking in the state. The standard form of communications is via the public switched telephone network. As indicated in Figure 4-3, there are approximately 30 telephone companies operating across the state. This results in a high percentage of "long-distance" calls for calls made over relatively short distances but crossing telephone company areas. Some of the problem has been eased through the use of IN-WATS service to the State Library.

The major statewide telephone system is the Direct Access Intercity Network (DAIN) which is made up of three elements:

(1) leased Telpak circuits (see Figure 4-4 at the end of this chapter) which, in conjunction with leased Wide Area Telephone Service (WATS), provide long-distance circuits to state government and University system users at a cost of about $700,000 annually;

(2) the DAIN switching center in Raleigh, operating at a cost of $2 million annually; and

(3) local telephone services, including provision of actual telephone instruments, key systems (multi-line telephones, intercoms, and call-switching equipment), and local circuits at $11 million annually.

The DAIN system provides excellent and economical voice service to most state government and University system users. Most respondents to both services and and facilities interviewed expressed satisfaction with the level of telephone services. However, tighter administrative control and education in effective telephone use could help promote even greater efficiency and reduce the number of non-business calls by users.

Additional leased and owned switching equipment and services are operating at University campuses, community colleges, hospitals, and other institutions. Other telephone services are operated for the express purpose of furthering public/government interaction: for example, the Department of Human Resources' CARE-LINE is an IN-WATS service through which both the general public and employees of health or social service agencies can obtain information about service agencies in the state. There is a need to study the feasibility of a state information center which would consolidate the existing IN-WATS services.

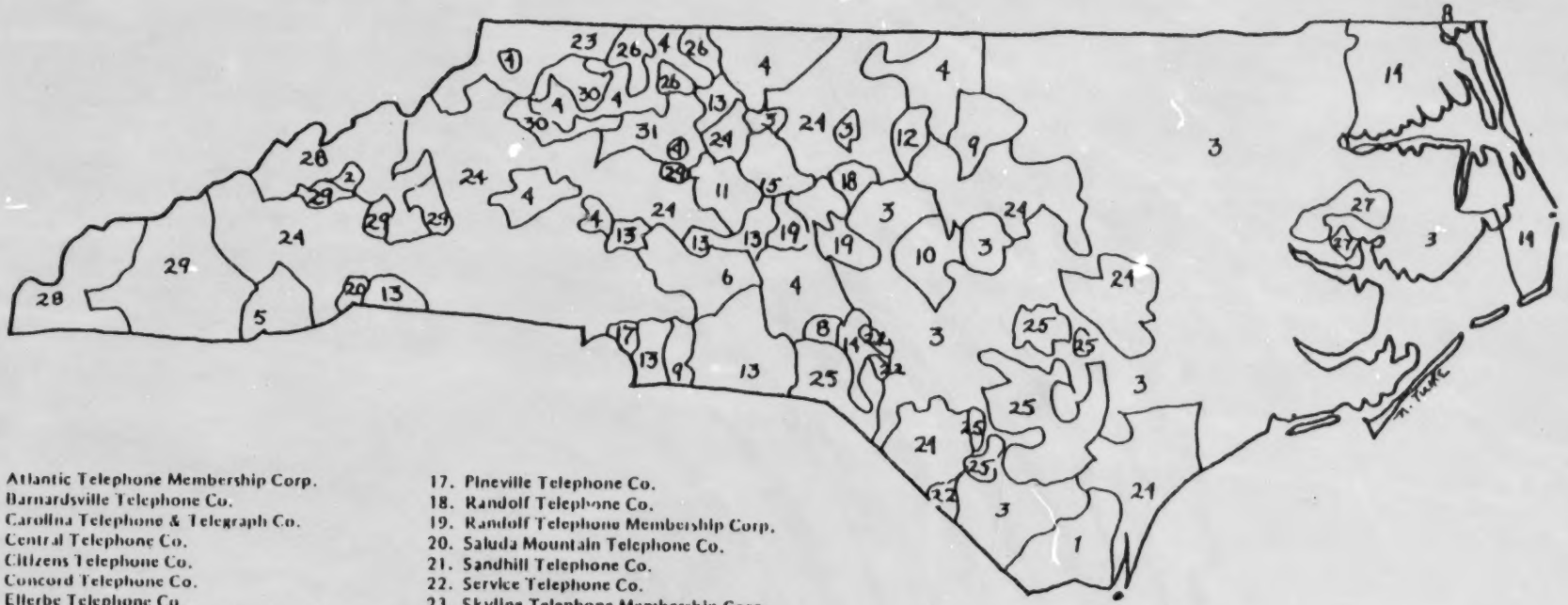
Any planning about state telephone service must take into account the fact that there are over 30 telephone companies currently operating within North Carolina. (See Figure 4-3.) The Public Utilities Commission is the primary state body with regulatory jurisdiction over these companies. But the state relationship to the phone companies also involves other concerns; for example, the telephone system is widely viewed as the basis of provision of public safety services.

North Carolina has a major commitment to provide all citizens access to cultural, educational, and information services. The role of telecommunica-

tions in meeting this commitment is significant now and potentially even more exciting. Currently, the emphasis is on the use of broadcast media. Radio and TV are clearly powerful and effective for many purposes. But now, with expansions of technology, broadcast media are being joined by new telecommunications techniques which will allow increased cultural, educational and information services to reach more citizens in every part of North Carolina.

Figure 4-4.

# Operating Areas of Telephone Companies



1. Atlantic Telephone Membership Corp.
2. Barnardsville Telephone Co.
3. Carolina Telephone & Telegraph Co.
4. Central Telephone Co.
5. Citizens Telephone Co.
6. Concord Telephone Co.
7. Ellerbe Telephone Co.
8. First Colony Telephone Co. of Virginia
9. General Telephone Co. of the Southeast
10. Helms Telephone Co.
11. Lexington Telephone Co.
12. Mebane Home Telephone Co., Inc.
13. Mid-Carolina Telephone Co.
14. Norfolk Telephone & Telegraph Co.
15. North State Telephone Co.
16. Piedmont Telephone Membership Corp.
17. Pineville Telephone Co.
18. Randolf Telephone Co.
19. Randolf Telephone Membership Corp.
20. Saluda Mountain Telephone Co.
21. Sandhill Telephone Co.
22. Service Telephone Co.
23. Skyline Telephone Membership Corp.
24. Southern Bell Telephone & Telegraph Co.
25. Star Telephone Membership Corp.
26. Surry Telephone Membership Corp.
27. Tri-County Telephone Membership Corp.
28. Westco Telephone Co.
29. Western Carolina Telephone Co.
30. Wilkes Telephone Membership Corp.
31. Yadkin Valley Telephone Membership Corp.

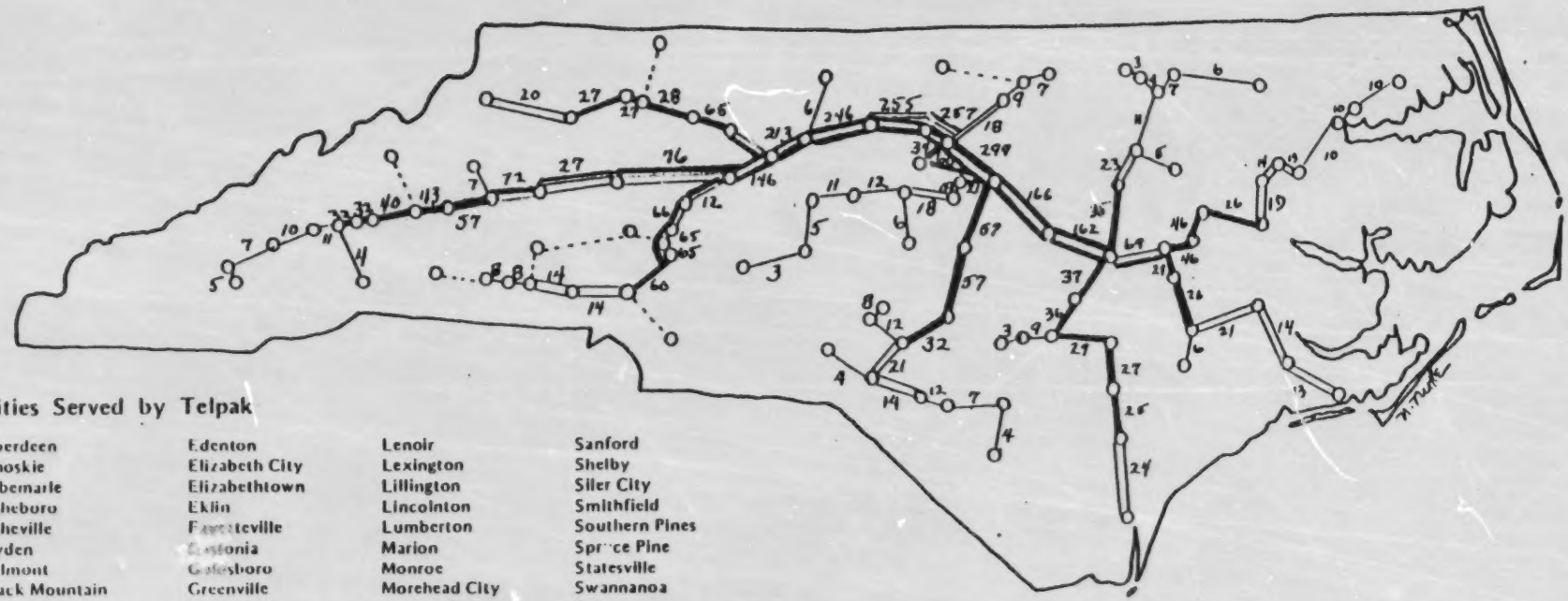
Note: No. 14 is in the process of merging with No. 3.

As of December, 1978.

Source: Interconnections for North Carolina and Beyond. Report of the North Carolina Task Force on Public Telecommunications to Governor James B. Hunt, Jr., April 1979.

Figure 4-5.

# Telpak Routes



## Cities Served by Telpak

Aberdeen
Ahoskie
Albemarle
Asheboro
Asheville
Ayden
Belmont
Black Mountain
Blowing Rock
Boone
Boonville
Burgaw
Burlington
Canton
Cary
Chapel Hill
Charlotte
China Grove
Clinton
Concord
Creedmoor
Cullowhee
Durham
Edenton
Elizabeth City
Elizabethtown
Eklin
Fayetteville
Gastonia
Gatesboro
Greenville
Halifax
Hamlet
Havelock
Henderson
Hendersonville
Hertford
Hickory
High Point
Hillsboro
Jackson
Jacksonville
Kannapolis
Kenansville
Kings Mountain
Kinston
Laurinburg
Lenoir
Lexington
Lillington
Lincolnton
Lumberton
Marion
Monroe
Morehead City
Mooresville
Morganton
Mt. Airy
Mt. Olive
New Bern
North Wilkesboro
Oxford
Pembroke
Pittsboro
Plymouth
Raeford
Raleigh
Reidsville
Roanoke Rapids
Rocky Mount
Roxboro
Rutherfordton
Salisbury
Sanford
Shelby
Siler City
Smithfield
Southern Pines
Spruce Pine
Statesville
Swannanoa
Sylva
Tarboro
Taylorsville
Trenton
Troy
Wallace
Warsaw
Washington
Waynesville
Weldon
Whiteville
Williamston
Wilmington
Wilson
Windsor
Winston-Salem

Source: (see Figure 4-4)

LEGEND

240 channels leased
60 channels leased
24 channels leased
12 channels leased
12 channels planned
Numbers indicate channels actually in use.

Total channels

Leased - 5,028 Used - 3,865

Total cost

Monthly - $59,112 Annually - $709,344

As of May 8, 1978

## SECTION 5

## A CONCEPTUAL FRAMEWORK FOR NETWORKING ACTIVITIES

In reviewing the literature concerning library networking activities, we came across a wide variety of descriptions with different levels of detail. There appeared to be a lack of any consensus as to the components of networks making comparisons very difficult. As a result of our review and the two-day panel session held in April 1982, we began to develop a framework for the description of networking activities. However, it soon became apparent that we were, in fact, defining a unified conceptual framework that could be applied to the analysis (description, comparison, costing, etc.), design and evaluation of library networking activities. This, we feel, represents a fundamental advance in the study of library networking.

The framework has the following interdependent dimensions:

- functions to be performed
- type of access to information
- types of materials handled
- products and services to be offered
- networking configurations
- communication means.

These dimensions comprise the first level of the framework and they each comprise several components. The dimensions, their components and their interrelationships are discussed below.

### Functions to be Performed

The key dimension in considering library networking activities is the function that might be performed through cooperative activities. It is important to emphasize, at this point, that by networking activities we mean any type of cooperative activity that may, or may not, be supported by some form

of technology. The functions that can be performed through library networking divide into three groups: those that relate to internal library operations, those that relate to patron services directly, and those that are derived from the first two types. Examples of these types of functions which could be achieved through networking activities in North Carolina are:

a) Library Operational Functions

- Acquisitions
- Cataloging
- Circulation recordkeeping
- Interlibrary loan request placement
- Staff training
- Referral to experts

b) User Related Functions

- Catalog searching
- Reference
- Referral
- Document (or other item) delivery
- User training

c) Derived Functions

- Collection development
- Online bibliographic searching
- Electronic mail

Type of Access to Information

The ability of cooperative networking to achieve these functions is dependent on two types of access to information: logical and physical. Logical access is provided through secondary information, such as the catalog or an index. Logical access to information can be provided at three different levels. The first level yields information about the *contents* of a collection. This information usually takes the form of a bibliographic record describing each

item, as in a catalog. The second level of logical access relates to the *location* of the item(s) sought. This is done by adding information about the holding institution to the item bibliographic record. The third level of logical access relates to the current *availability* of items. This can be achieved by linking the bibliographic cataloging information with circulation information to determine whether the required item is available in the holding library at the time, or whether it is on loan or on reserve.

Physical access is access to the primary information itself. To a large extent, physical access is dependent on logical access. It might be argued that browsing is a form of physical access that can be achieved without logical access (although if browsing a shelf of books in a library, the logical access is provided through the classification order of the books). However, in most cases, physical access requires prior logical access. This is important for the sequencing of implementation planning as demonstrated later in this report (see Section 10).

Types of Materials Handled

This dimension is more or less self-explanatory and is concerned with the types of materials that are handled by the networking activities. The range of materials is fairly broad and includes monographs, serials, technical reports, state and federal documents, manuscripts, audiovisuals, records of various types (ILL requests, circulation transactions, etc.), equipment and machinery (such as film projectors, reading machines for the blind, etc.), and human resource expertise.

Products and Services to be Offered

The products and services that can be offered as an outcome of networking activities depend very much on the functions being performed and on the type of access that is permitted, and to a lesser extent on the types of materials handled. This is because often the same type of product or service covers several types of materials. Services refer to the activities conducted by the

network in order to achieve certain functions. Products are the tangible results of the network services. The products and services relating to each of the functions identified previously are displayed below (see Tables 5-1, 5-2 and 5-3). It should be mentioned at this point that the products and services listed below will not all be part of the networking activity in North Carolina. We have listed *potential* products and services that could be implemented. Even if all are desirable for libraries in the state it would be necessary to prioritize them for implementation purposes, so that they can be phased into the overall networking activity.

Networking Configurations

This dimension refers to the relationships between the participants in the networking activity. It is the basis on which the communication links are established and implemented. For example, all the libraries in the state could communicate with each other through a central point such as the State Library (configuration A in Figure 5-1), or all libraries located within a geographic region could communicate with each other, and with other regions through a central point such as the State Library (configuration B in Figure 5-1).

Rather than impose a formal, rigid configuration on libraries in the state, we prefer to describe networking configurations in terms of "zones of convenience" or ZOCs. A ZOC is defined as a library or group of libraries that can conveniently share resources. The convenience can arise from a variety of factors, including, but not limited to:

- geographic proximity
- similarities in types of patrons
- dissimilarities in collections
- existing cooperative relationships
- special relationships among libraries or librarians.

Membership in one zone does not exclude membership in another. Membership can also change over time. We feel that this approach to configuration

TABLE 5-1. LIBRARY OPERATING FUNCTIONS

| Functions | Services | Products |
|---|---|---|
| Acquisitions | Ordering<br>Receiving<br>Funds transfer | Purchased item<br>Acquisitions lists<br>Statements of accounts |
| Document (or other item) Processing | Cataloging<br>Labeling | Catalog records<br>Labeled items |
| Circulation Record-Keeping | Patron registration<br>Item check-in<br>Item check-out<br>Item reserves<br>Overdue identification | Transaction records<br>Patron lists<br>Overdue notices |
| ILL Request Placement | ILL request placement | ILL request |
| Staff Training | Staff training | More trained personnel |
| Referral to Experts | Identification and location of experts within the state | Lists or directories of experts |

TABLE 5-2. USER RELATED FUNCTIONS

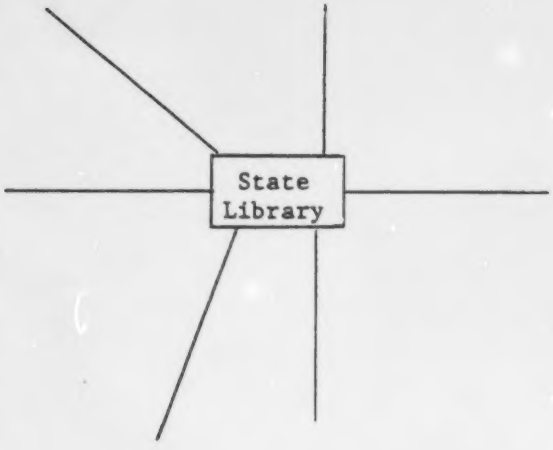
| Functions | Services | Products |
|---|---|---|
| Reference | Catalog searching<br>Reference<br>Referral | Catalog information<br>Request fulfillment |
| Physical Access | Document delivery | Requested item |
| User Training | User training | Trained users |

TABLE 5-3. DERIVED FUNCTIONS

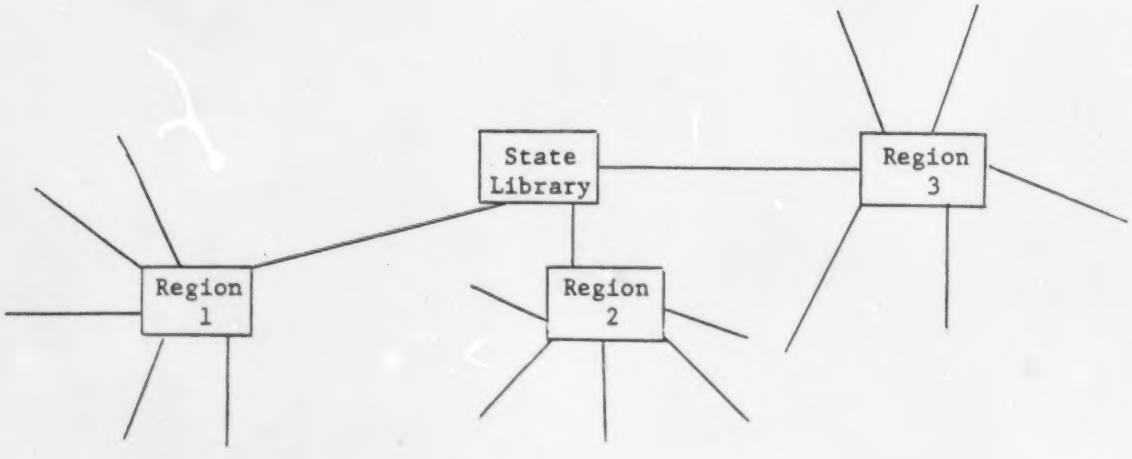
| Functions | Services | |
|---|---|---|
| Collection Development | | Lists or directories of specialized collections |
| | | Union lists |
| Reference | On-line searching | Search outputs |
| Communications | Electronic mail | Messages |
| Other | Word processing | Documents |

Figure 5-1.

Sample Network Configurations




Configuration A




Configuration B

will allow libraries in the state a sufficiently flexible way to establish networking without destroying or eroding existing cooperative practices which have been established over a period of time. The concept of a ZOC fits well into the current modes of operation but allows further growth and expansion of networking activities within the state.

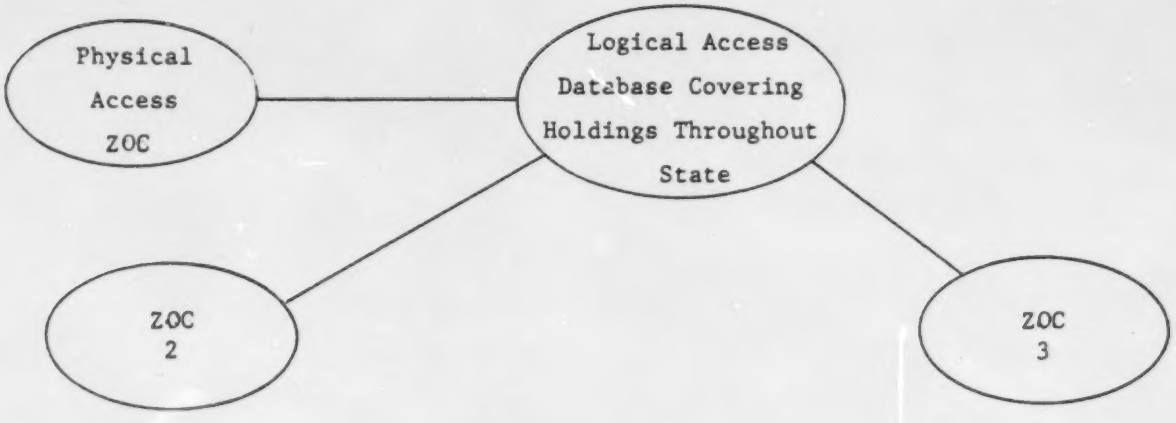
The definitions of the ZOCs may well differ according to the networking functions to be performed. In other words, a library may belong to one ZOC because it performs one function, and to another because it performs a different function. Alternatively, ZOCs can provide different sets of products and services. Yet another important relationship is that between the types of access (logical and physical) and the ZOCs. The extent of coverage of the logical access data base (i.e., the secondary information used to identify, locate and determine availability of primary information) should be, at minimum, coverage of the holdings of the participants in a ZOC. The extent of coverage of physical access again should be at least that of the area containing all libraries participating in a ZOC. The logical access data base should have, at least, the same coverage as the physical access but can extend beyond. In other words, it is feasible that a logical access data base cover several ZOCs each defined by a convenient physical access mechanism. It is not unreasonable to consider the logical access data base to cover the entire state's library holdings and to have several ZOCs access it (as demonstrated in Figure 5-2). On the other hand, one could equally well envisage a series of regional logical access data bases together covering statewide holdings, each with coincident ZOCs for physical access (see Figure 5-3).

Communication Means

This dimension refers to the actual mode of communication between the networking participants. We wish to stress, once more, that networking does not necessarily imply some form of automation and telecommunication. We envisage a variety of communication means being utilized in the North Carolina networking activities. Such means range over telephone (including WATS lines, MCI-type services, leased lines, etc.), TWX, existing telecommunications networks

Figure 5-2.

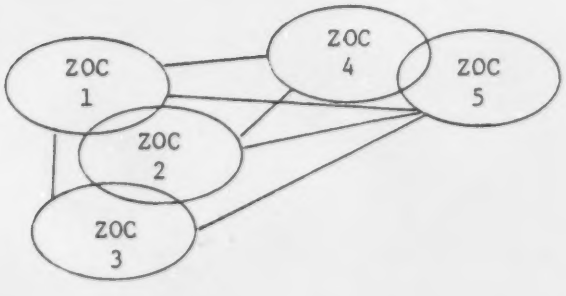
Centralized Logical Access Database




Each ZOC searches the database for desired items and selects holding institutions that are members of the ZOC if possible.

Figure 5-3.

Regional Logical Access Databases




Each ZOC has its own logical access database which is searched first for a required item. If the item is not found, then search is continued on the neighboring ZOC database.

(such as the State data network, TELENET and TYMNET), mail service, courier services and so on. The communications mechanism used will be determined, to a large extent, on the function being performed and on economic decisions made by the individual networking participants.

SECTION 6

NEEDS OF LIBRARIANS IN NORTH CAROLINA

## 6.1 Introduction

In the weeks of February 8 and 15, 1982, state network needs assessment process was conducted by holding four hearings, and meetings with staff of sixteen libraries across the state of North Carolina. The overall purpose of these activities was to hear from librarians and other interested persons what their interests and values were concerning library cooperation, the conditions which affect cooperation, and what cooperative activities were already occurring. To prepare for these meetings, the Division of State Library, North Carolina Department of Cultural Resources, with the assistance of KRI, prepared a Background Paper and Memorandum which were sent out in advance and were also available at the hearings. The following seven questions were listed in the Memorandum as discussion points and were used at the hearings and individual meetings:

1. What existing cooperative activities does your library participate in?

2. What are your existing or planned library automation activities?

3. From your point of view, how would you envision a statewide library network that would meet your needs?

4. Which of your library services could be enhanced by some degree of participation in a statewide library network?

5. What are the conditions that foster the development of a statewide library network?

6. What are the conditions that inhibit the development of a statewide library network?

7. Given two or more different approaches to a statewide library network, what are the most important criteria for evaluating the approaches?

The hearings were scheduled and took place as follows:

Public Library of Charlotte and Mecklenburg Co.---February 9, 1982
Asheville-Buncombe Public Library---February 11, 1982
Greensboro Public Library---February 16, 1982
East Carolina Univeristy, Willis Bldg.---February 18, 1982

Those attending each of the hearings were asked to register on a sign-up sheet, indicating their organizational affiliation. These sheets can be used to obtain the number and kinds of people attending, although the numbers probably underestimate the number actually attending and occasionally the organizational affiliation is difficult to interpret.

Numbers of those signing ranged from 26 to 73 at the four hearings. In all, 186 people registered at the hearings.

The numbers of persons and kinds of libraries represented are shown in Table 6.1. The proportions of attendees from different types of libraries was relatively similar in the four hearing sites. Almost half of those registering were from public libraries. Approximately 20% were from academic libraries. School libraries were represented by approximately 10% of those attending, reflecting in part the difficulty school librarians have in attending daytime meetings. The category of "Other", which composed 12.9% of the attendees, was made up of library educators and students, members of the State Library Commission not representing a particular library type, board members and friends of public libraries, and representatives of the State Department of Public Education and the Department of Cultural Resources.

In addition to KRI staff, the Project Coordinator and the State Librarian from the Department of Cultural Resources attended each of the hearings.

At the sites at which hearings were held, meetings were held with staff from the following libraries:

TABLE 6-1. SUMMARY OF ATTENDEES AT HEARINGS

| Hearing Site | # Attending | Public Library % | Academic Library % | Community College Library % | School Library % | Special Library % | Other % |
|---|---|---|---|---|---|---|---|
| Charlotte | 40 | 45 | 15 | 5 | 15 | 7.3 | 12.5 |
| Asheville | 26 | 50 | 23 | 8 | 8 | 8 | 4 |
| Greensboro | 73 | 41 | 23 | 4 | 4 | 9 | 18 |
| Greenville | 47 | 38 | 26 | 11 | 11 | 4 | 11 |
| Total | 186 | 42.5 | 22 | 6.5 | 8.6 | 7.5 | 12.9 |

Public Library of Charlotte and Mecklenburg Co.
Gaston-Lincoln Regional Library
UNC-Charlotte
Asheville-Buncombe Public Library
UNC-Asheville
Greensboro Public Library
UNC-Greensboro
First Baptist Church Library, Greensboro
Burlington Industries Library
Greensburo Public Schools Processing Center
Guilford Technical Institute Learning Resource Center
Rockingham County Public Library
3HM Regional Libraries
Sheppard Memorial Library (Greenville)
J.Y. Joyner Library (ECU)
NCSU-D. H. Hill Library
N.C. Department of Community Colleges
Burroughs Wellcome Co.-Technical Information Department
National Humanities Center
N.C. Scientific & Technical Research Center
N.C. School of Science and Mathematics
Duke University-Perkins Library
UNC-CH, Wilson Library
NIEHS
NCCU-School of Library Science

The background material that was circulated to librarians throughout the state prior to the hearings is attached as Appendix 3.

After the hearings, the project team received a number of communications from librarians throughout the state. The expressed needs and suggestions were incorporated into our assessment of library needs in North Carolina.

## 6.2 Possible Network Functions for North Carolina

In times when it is widely acknowledged that most libraries can acquire only a portion of the materials needed or desired by their users, cooperative

acquisitions may hold much appeal as a possible function of a statewide library network. A decision to adopt such a function could mean offering participating libraries a structure within which cooperative acquisition planning would be done, previewing or reviewing potential resources would be shared, and even the actual purchasing of materials would be cooperatively handled. Benefits to participating libraries would include improved decision making, reductions in unnecessary duplication, reduced costs, and the generation of various products, such as review lists and tools for the use of others.

Cooperative cataloging is often a function of library networks. The creation and maintenance of a data base of bibliographic records facilitates shared cataloging among member libraries for both new materials and for the retrospective conversion of existing catalog records. A network providing resources for cooperative cataloging could also make available a high level of cataloging expertise for libraries needing to create records for unusual materials. Products of cooperative cataloging services would include a reduction in duplication of cataloging efforts, catalog records themselves, in whatever formats participating libraries deemed appropriate, machine readable retrospective catalogs produced at lower costs than if each record had to be originally recataloged, and improved cataloging of nontraditional materials and titles.

Economies of scale may be realized if a statewide library network offers cooperative processing of materials to its members. Such a function would certainly complement the above mentioned cooperative acquisitions function. Shared processing would result in processed documents available at a reduced cost and perhaps, more quickly.

One essential facet of the process of sharing library resources is logical access, i.e., knowing what resources are available and where they are located. The provision of a comprehensive and up to date record of the holdings of libraries within a state is a potential service of a state library network. Such records would provide location information on serials, monograph, and multi-media holdings and might also serve as a resource for bibliographic verification. Products generated from this service could include a union catalog with title, author, and/or subject access, a union list of serials, and a directory of special

collections. Greater ILL efficiency could result from having available a statewide record of locations, for requests could be immediately directed to a known owner of the material.

A valuable supplement to a data base providing a record of locations of all materials held by North Carolina libraries would be a record of the availability of such holdings, i.e., whether or not the needed material is on the shelf and available for use. A statewide automated circulation system would provide such information in addition to traditional circulation control records for participating libraries. In addition to increasing the efficiency of ILL services, such a system would produce a statewide patron file and could be designed to produce significant kinds of data on library use in the state. The existence of such a file can raise questions of privacy and security. However, we do not intend to imply the establishment of one centralized file containing patron information, rather we are recommending a distributed file (as exists at present albeit in mixed formats). We anticipate that, over time, these patron files will be converted into machine-readable form, thereby facilitating the generation of statistical reports. By preserving patron files at the local levels security is not compromised. In automated environments, access to patron files is authorized by the system manager and usually controlled through system passwords.

Reference has been made in discussing previously mentioned functions to services which would increase the efficiency of ILL services. The provision of an efficient interlibrary loan system by a state network would enable users of all participating libraries to obtain needed materials from many library collections in North Carolina. Decisions would need to be made about the kinds of materials that would be available for borrowing within the ILL structure. In addition to the customary provision of adult nonfiction resources, decision makers may wish to include adult fiction, serials, children's materials, and A-V materials.

Users of many kinds of libraries need access to state and federal documents. The provision of such access could be another service of a state network. Coordinated sharing of document storage, together with bibliographic control can

mean increased access to this valuable type of resource for the users and staff of all participating libraries.

Any state library network engaging in resource sharing needs to consider whether document delivery should be a network function or if participating libraries should arrange independently for the movement of materials between themselves. A statewide document delivery system could offer rapid delivery of documents in a coordinated manner, thereby reducing ILL turnaround time and better meeting the needs of users.

The backup of local reference resources with a statewide reference referral system could effectively broaden both the information resources available to state residents as well as the skilled library service at their disposal. As a network function, reference referral is frequently seen as a component of an ILL system. Reference questions are "translated" into ILL requests for materials thought to contain the answers. Such a dual purpose system is often imprecise, resulting in materials which may or may not be appropriate being sent from library to library, rather than reference questions and answers or partial answers being exchanged. The use of microcomputer-based reference support systems can be used to overcome some of these problems, by storing (for future use) reference requests and their answers. One system designed to perform this function is REFLES, described on pages 25-26.

The listing of functions, services, and products was developed by examining activities of existing networks (see Table 6-2), reviewing existing cooperative activities in North Carolina, and adding activities that were cited as desirable at the hearings or in individual interviews. The potential functions and related services, products, and benefits are summarized in Table 6-3. The needs assessment process also identified the criteria that should be applied in North Carolina to assess which functions should be emphasized and in what form they should be manifested.

TABLE 6-2. ACTIVITIES OF SELECTED STATE LIBRARY NETWORKS

| Function | MINITEX | 3R's | WLN | INCOLSA (a) and Indiana Library and Information Services Network (b) | COWL | ILLINET |
|---|---|---|---|---|---|---|
| 1. Cooperative Acquisitions | | X | X | | | X |
| 2. Cooperative Cataloging | X | | X | X(a) | X | X |
| 3. Cooperative Processing | | | | X(a) | | |
| 4. Record of Location of State Holdings | X | X | X | X(a) | X | X |
| 5. Record of Availability of State Holdings | | | X | | | X |
| 6. Resource Sharing | X | X | X | X(b) | X | X |
| 7. Access to State and Federal Documents | | | | | | |
| 8. Document Delivery | X | X | X | X(b) | X | X |
| 9. Reference Referral | X | X | | X(b) | X | X |
| 10. Staff Training | X | X | X | X(a) | X | X |
| 11. Communications | X | X | X | | | |

*SOURCE: Encyclopedia of Information Systems and Services

MINITEX - Minnesota Interlibrary Telecommunications Exchange

3R's - New York State Library: Reference and Research Library Resources System

WLN - Washington Library Network

INCOLSA - Indiana Cooperative Library Services Authority

COWL - Council of Wisconsin Librarians

ILLINET - Illinois Library and Information Network

TABLE 6-3. POTENTIAL NETWORK FUNCTIONS AND RELATED SERVICES, PRODUCTS AND BENEFITS

| Network Function | Service | Product | Expected Benefits |
|---|---|---|---|
| Acquisitions | Acquisition planning<br>Previewing/reviewing<br>Ordering<br>Receiving<br>Funds transfer | Purchased items<br>Acquisitions lists<br>Multi-media review lists<br>Account statements | Improved decision making<br>Reduced duplication<br>Reduced cost |
| Processing | Cataloging | Catalog records<br>Machine-readable retrospective catalogs<br>Standardized records for retrospective cataloging<br>Record of location of state holdings | Reduced duplication of cat. effort<br>Incr. cataloging expertise<br>Improved cataloging of nontraditional materials or titles<br>Reduced cost<br>Improved access to state holdings<br>Union catalog<br>Directory of special collections<br>Union list of serials |
| | Physical processing | Processed items | Reduced cost |
| Circulation Recordkeeping | Patron registration<br>Item check-in<br>Item check-out<br>Item reserves<br>Overdue identification | Recording<br>Availability of state holdings<br>Statewide patron file<br>Overdue notices | Improved ILL response<br>Improved data on use patterns<br>Reduced cost |
| ILL | Access to state holdings | ILL requests | Increased access to all types of materials held within state |
| Reference referral | Provision of additional resources & expertise<br>Centralized searching of online data bases | Directories of special collections<br>Directories of resource people | Increased ability to meet user needs for information<br>Increased access to broaden range of resources |
| Document delivery | Statewide delivery of materials | Delivered items | Reduced ILL turnaround time |
| Staff training | C.E. planning | Well planned and located C.E. workshops<br>Training resources (packets, A-V materials, etc.) | Reduced costs<br>Improved C.E. programs |
| Communications | Statewide communications | Electronic mail and message centers | Increased ability to plan |

The first criterion to be considered is cost. In a time when each library in the state is concerned about local funding levels, the cost of participating in any statewide network was of immediate concern to most we spoke with. Specifically, each library must be able to justify its cost of participation in terms of benefits received or savings realized. A particular cost cited repeatedly was that of telecommunications. The state library must also be able to justify the costs of providing network services or administering network activities in terms of benefits or collective savings.

A second criterion frequently cited was whether the proposed statewide network would restrict local autonomy. Libraries of all types are conscious of their primary obligation to be responsive to the demands of their immediate, supporting constituency. Membership in a network will not be sought if it implies a restriction of local decision making abilities or even dependency on a remote service. To the degree possible, network functions must be designed so that they are seen to enhance rather than reduce local autonomy. This implies a preference for distributed rather than centralized organization. This also implies the design of a network that is permissive rather than mandatory; if a local library chooses to participate and to benefit it may, but participation is not imposed on the local library. The present processing centers provide such a service.

A third frequently mentioned criterion was that the statewide network needs to provide something for every participant. In order for the network design to gain acceptance throughout the state, it will have to offer relatively quick benefits to every potential member. And the benefits will have to be perceived as equitable; that is, in proportion to some measure of participation. If benefits are seen as too "long range" or serving only the larger libraries or being inequitable in some other way, the entire network design will fail to gain statewide acceptance.

The statewide network design will need to be assessed in terms of whether it allows regional organization. The communication lines in North Carolina are long. Network services designed to be centralized from Raleigh may not meet the needs of libraries in the Western and Eastern parts of the state because of delays in communications and delivery. Libraries at the greater distance from Raleigh

prefer a design which allows regional organization with state back-up. Libraries in the central area have relatively quick access to services in the Raleigh area and therefore do not request a regional organization pattern. The network design should accommodate these different needs and should, where delays of delivery are an issue, allow for regional cooperation.

Is the level of technology required by the network design appropriate to the needs and capacities of North Carolina libraries? Statewide networking suggests to many statewide automation of library operations. Testimony from a great number of libraries indicated that this assumption should be questioned. It was pointed out that many cooperative activities did not require automation and that, for many libraries, automation was presently out of reach for libraries struggling to acquire materials. Each proposed service or product should be assessed, therefore in terms of whether it is designed at an appropriate level of technology. A related concern is that all proposed services and products should not require automation at the local level for all participants.

Compatibility with existing and developing activities was frequently cited as a criterion. North Carolina has already supported services with potential for statewide networking application: Dataphase circulation systems for public libraries, processing centers for public and community college libraries, IN-WATS service for inter-library loan, TRLN development of a database for academic libraries. In order to incorporate the benefits of these applications and minimize the additional investment required, it was strongly urged that proposed designs should be compatible with these efforts.

It was recommended that proposed automation applications should be possible to implement using microcomputers. It is expected that a significant number of libraries in the next decade will own or have access to microcomputers. If network designs would use micros as building blocks, local library acceptance would be more likely, and regional organization would be more likely.

The degree to which a network design requires retrospective conversion was a concern. Conversion of existing records for the millions of titles al-

ready held in North Carolina libraries will require large investments in time and money, and there was concern that the level of effort required could not be justified in terms of benefits. The design of a database, should that be a function of the proposed network, should minimize the effort required for retrospective conversion (for example, by using OCLC) so that local libraries can afford to participate. Other alternative sources for conversion include MINI MARC (described on page 21), REMARC (a conversion service provided from the LC data base), or the machine-readable data bases of similar libraries.

SECTION 7

# ALTERNATIVES FOR LIBRARY NETWORKING IN NORTH CAROLINA

## 7.1 The Evolution of Alternative Approaches

The development of alternative approaches to library networking in North Carolina was an evolutionary process. Some preliminary concepts were included in the original RFP. KRI's proposal responded to them and included some new ideas. Then, in actually performing the study, the specifics of the North Carolina environment (as described in Section 4) came into play. As we talked to and heard from librarians across the state about current practices and cooperative arrangements, and current and future needs, our view of potential networking activities began to evolve. Our preliminary assessment of needs was submitted for review and feedback, and formed part of the background material for the two-day panel session. This session was especially useful in formulating networking approaches and implementation priorities. It was highly iterative and throughout the two days ideas were presented, discussed, reformulated in the light of the discussion, and presented again, etc. The project team left the panel session with the nucleus of an approach which has since evolved through several further iterations as a result of discussion both with potential participants in the networking activities (SOLINET, OCLC, etc.), as well as internally at KRI.

The alternatives discussed in this section, therefore, are the result of a series of interactions (with the panel, with librarians and other interested parties in the state, with potential participants outside the state) and the experiences of the KRI project team on similar projects and with current and projected future information technologies.

The conceptual framework outlined in Section 5 will be used in our specification of alternatives for networking within the state. The framework as described comprises six interdependent dimensions:

- functions to be performed
- types of access to information
- types of materials handled

- services and products to be offered
- networking configurations
- communication means

Alternatives can be defined by taking any of the dimensions as the base, selecting a single option for that dimension and combining it with selected options from the dimensions. For example, we could select a function such as cataloging; the materials to be cataloged might be monographs; the service, cataloging; the product catalog cards, the configuration, all school libraries; and the means of communication, mail. Alternatively, we might select the type of materials first, for example serials, and then acquisitions as the function, union lists (for the entire state as well as for individual ZOCs) as the products, ZOCs (based on a variety of convenience factors), and the means of communicating a mixture of mail and dial-up terminal access. It is clear that the number of possible alternatives is very large. The reduction of the total number of possible alternatives to a manageable number of feasible alternatives is based largely on past experiences and future perceptions. Anticipating this situation we proposed that a panel of experts be brought together for a session that would be held approximately mid-way through the project.

### 7.1.1 Panel Session

A two-day session was held on April 15th and 16th at the State Library in Raleigh. The invited panelists were:

- Glynn Evans, Director, SUNY/OCLC Network
- William Ford, Chairman, Online Computer Systems, Inc.
- Ronald Miller, Executive Director, California Library Authority for Systems and Services (CLASS)

The following people were also invited to participate:

NCLA Networking Committee

Ruth Katz, Associate Director, Joyner Library, East Carolina Univ.; Chairman

Elsie Brumback, Deputy, Assistant State Superintendent, Area of Support Services, and Director, Division of Educational Media, Dept. of Public Instruction

James Govan, University Librarian, Wilson Library, Univ. of North Carolina, Chapel Hill

Alan R. Samuels, Ass't. Professor, Dept. of Library Science/Educational Technology, Univ. of North Carolina, Greensboro

Pam Doyle, Director Media Services Section, Dept. of Community Colleges

Alberta McKay, Librarian, Geological Survey, Dept. of Natural Resources and Community Development

Shirley McLaughlin, Director, Learning Resource Center, Asheville-Buncombe Technical College

Patsy Hansel, Ass't. Director, Cumberland County Public Library, Fayetteville

Eunice Drum, Chief, Technical Services, Division of State Library

Lynn Dorn, Media Specialist, Weaver Education Center, Greensboro

Helen DeWitt, Adm. Assistant, Charlotte-Mecklenburg Public Library

Billie McDowell, Coordinator of Library Service, Pitt Community College, Greenville

Ad Hoc Committee on Multitype Library Cooperation

Jane Lambremont, AHEC Liaison Librarian, Health Sciences Library, UNC-CH

Tera White, Manager, Corporate Information Services, Information Center, Blue Cross/Blue Shield of North Carolina, Durham

Mary Holloway, Consultant, Division of Educational Media, Dept. of Public Instruction

George Viele, Director, Greensboro Public Library

Vergie Cox, Director, Materials Review and Evaluation Center, Dept. of Public Instruction

William C. Horner, Systems Librarian, D. H. Hill Library, North Carolina State University, Raleigh

Ed Lynch, Director, Learning Resource Center, Technical College of Alamance, Haw River

Mertys Bell, Director, Learning Resource Center, Guilford Technical Institute, Jamestown, NC (President of NCLA)

Technical Subcommittee, Ad Hoc Committee on Multitype Library Cooperation

Bill Horner, Chairman (see above)
Arlon Kemple, Computer Center Manager, Dept. of Cultural Resources
John Knight, Technical Information Specialist, Environmental Protection Agency Library, Research Triangle Park
Stella Townsend, Director of Technical Services, Greensboro City Schools
Ashby Wilson, Systems Librarian, Greensboro Public Library
Julian Wingfield, Director, Management Information Services, Dept. of Community Colleges

Division of State Library

David McKay, Director
Jane Williams, Assistant Director
Marge Lindsey, Consultant for Multitype Library Cooperation; Coordinator

Invited Observers

Arial Stephens, Director, Public Library of Charlotte & Mecklenburg County
Phil Ritter, Director, Gaston-Lincoln Regional Library, Gastonia
Kenneth E. Brown, Director, Asheville-Buncombe Library System
Willie Nelms, Director, Sheppard Memorial Library, Greenville
Joe Hewitt, Assoc. Univ. Librarian, Technical Services, UNC-Chapel Hill
Jeanne Sawyer, TRLN, UNC-Chapel Hill
Elvin E. Stroud, University Librarian, Perkins Library, Duke University, Durham
Nancy Cowan, Head, Processing Center, Technical Services Section, Division of State Library
David Bevan, Chief, Information Services Section, Division of State Library
Sue Farr, Head, In-WATS and Interlibrary Loan, Information Services Section, Division of State Library
Charles Fox, Chief, Special Services Section, Division of State Library
Marion Johnson, Chief, Public Library Development Section, Division of State Library
Frances Reid, Generalist Consultant, Public Library Development Section, Division of State Library
John Welch, Generalist Consultant, Public Library Development Section, Division of State Library
Nancy Wallace, Adult/Young Adult Services Consultant, Public Library Development Section, Division of State Library
Diana Young, Children's Services Consultant, Public Library Development Section, Division of State Library
I. T. Littleton, Director, D. H. Hill Library, NCSU Raleigh
Ildiko Trombitas, Library Director, Burroughs Hellcome, Research Triangle

Prior to the session, all the participants were sent copies of, or given access to copies of, the Request for Proposals (RFP), the KRI proposal, and the preliminary draft of the Needs Assessment for a Statewide Library Network in North

Carolina. This gave all participants the same basis for discussion of alternatives. The meeting began with a presentation by the KRI project team, on the following topics:

- Introduction to the study
- Results of the needs assessment
- Definition of alternative approaches to a statewide library network
- Framework for evaluating alternatives.

After the presentation, discussion was opened to the three invited panelists to comment on their background and experiences with library networking. Finally, the discussion was opened up to the entire group. The proceedings of the first day were kept at a relatively general level as far as the derivation of alternatives were concerned. In order that interaction might become more specific, a smaller working group was defined (prior to the session) with the following composition:

- José-Marie Griffiths
- Donald King
- Glyn Evans
- William Ford
- Ronald Miller
- David McKay
- Jane Williams
- Marge Lindsey
- Mertys Bell
- Elsie Brumback
- Bill Horner
- Ruth Katz
- Arlon Kemple
- George Viele

The working group met on the morning of the second day, and started with a brief presentation by the KRI project team and invited panelists on the results of the previous day's discussions and a revised statement of alternatives. Discussion

then focussed on these alternatives. In the afternoon of the second day, the results to date were presented to the full participant group for comment and feedback. The final outcome of the two-day session is presented briefly below.

Five potential network functions were identified:

- collection development
- technical processing
- logical access to materials
- physical access to materials
- communications

Of these five functions, it was agreed that logical access should receive primary focus. Without logical access (i.e., knowing which materials are located within the state, and in which library), all the others are virtually impossible to achieve. The panel, therefore, recommended that the first step towards library networking in North Carolina is the building of the bibliographic database that will provide the logical access to holdings. This database should, eventually, contain information about as much of statewide library holdings as possible (ideally one would say all the holdings should be covered, but that approach results in questions of definitions of a library, etc.). We did not indicate where such a database would reside, nor whether it would exist in isolation from similar data for other libraries. These are alternatives which we discuss later in this section. The means through which libraries would interact with the bibliographic database would be determined by ongoing parallel developments in both computer hardware (microcomputers, intelligent terminals, communications channels) and software (library automation packages and systems like CLSI, DataPhase, ILS, LAMBDA, LLS, TLS, etc.) as described in Section 2.

The bibliographic database should cover a variety of materials including monographs, serials, media and training materials, and state documents. A number of implementation-related options exist to achieve the building of a statewide logical access database. They include:

- use of OCLC directly (as a state network like PALINET, ILLINET)

- use of OCLC via SOLINET
- direct input to database by libraries
- input to database by processing centers for libraries
- setting up of a state facility based on systems like LAMBDA, WLN or CLASS (for serials), etc.

The inclusion of OCLC as the cataloging utility used in most of the above alternatives is based on current stored cataloging activity in the state. The majority of libraries in the state that use a cataloging utility are members of OCLC (albeit via SOLINET). Therefore, a considerable investment has been made, by participating libraries, in the OCLC database. Such investment should not be wasted. It is true that some libraries in the state are members of RLIN, but with the recent arrangements between RLIN and OCLC information pertaining to the holdings of the RLIN libraries can be included in the OCLC database, and reciprocally, the RLIN libraries can access information concerning the holdings of OCLC member libraries.

The second step towards networking is the development of physical access mechanisms-document (and other item) delivery services. The main comment here was that existing services (mail and courier) be reviewed, and that some form of reimbursal and/or other support be designed to compensate heavy lenders of materials.

The panel agreed that no major efforts should be initiated at present to either procure equipment or to refine collection development practices. The rationale underlying the first of these two points was that automated library systems are currently in a state of flux. As discussed earlier in Section 2, no single vendor has a fully integrated library automation system available today. Many vendors have plans to develop such systems, but it will be three to five years before they do so. The panel, therefore, recommended that those vendors who intend to produce integrated systems be monitored for progress until at least the basic modules are available (circulation, public access catalog, serials control, acquisitions). It was felt that there will be considerable development of the integrated library systems, but that after two or so years, a pattern will begin to emerge as the technology of automated library systems begins to stabilize. This does not mean that programs will stop. Rather, the types of changes and

features added to systems will not significantly alter their structure. This stabilization will probably remain for a number of years and represents the "plateau of least risk" for investment of new technology as the products do not change significantly and as vendors produce very similar systems.

The rationale underlying the recommended wait to refine collection development practices stems from the reliance of statewide collection development activities on knowledge of statewide holdings. Collection development is, therefore, best left until the statewide bibliographic database has been built (although it would be unnecessary to wait until it was 100% complete). It was felt that macro-level collection development decisions should be made, along the lines currently practiced by some academic libraries, e.g., library A develops its Chinese collection, library B its Japanese. Finally, special collections throughout the state should be recorded at least in terms of subject matter, extent of coverage, and location. A directory of special collections in North Carolina libraries could then be produced (there are a number of alternatives for recording the information and producing the directory which were not detailed at the panel session but which will be discussed later in this section).

The final step which we felt was necessary to ensure successful statewide networking was the establishment of mechanisms or procedures for monitoring, feedback and evaluation. Obviously these mechanisms or procedures would be highly dependent on the exact formulation of implementation alternatives developed. One example we recommended, was the creation of a single point of contact (a person or an office) to liaise between SOLINET and the libraries within the state. This person or office would be responsible for monitoring changes in services, policies, etc., disseminating information about the changes, and for relating reactions and responses of librarians in North Carolina to SOLINET. The process is not necessarily initiated by SOLINET and their proposed changes. Librarians in the state could develop requirements which are not currently met by SOLINET services, or suggest enhancements to the current services, etc. and initiate the communications process themselves. Input could also be transmitted from nonmembers or potential members of SOLINET.

The two-day session was extremely successful for a number of reasons. First, it allowed the project team to take a first cut at alternative networking approaches for libraries within the state and to get feedback from both recognized

experts in the field of library networking, as well as from librarians within the state. Such feedback is rarely obtained until after completion of the study when it can no longer be incorporated. The KRI team did make changes to their approach based on the two-day session, and other suggestions they made were confirmed by participants. As mentioned earlier in this section, both planning and designing are cyclical processes and the panel session enabled us to complete another loop.

A second reason for the success of the session was the participation and representativeof a large proportion of the library community in North Carolina. We made a conscious effort to involve as large a cross section of the entire library community as possible, so that their input could be incorporated in the statewide plan. Many of the participants reported that they found the session very informative and useful to them in discovering not only the state-of-the-art of library networking but also various activities in other parts of the state. In fact, all three of the guest panelists remarked that they found the two days very stimulating - so much so that they and our two project team members will reconvene later this year in New York.

Finally, from the viewpoint of acceptance of any networking plan for the state of North Carolina, it is important that those who are to be affected by such a plan be involved in the planning process. King Research has long favored a participatory approach to planning* and the two-day session certainly confirmed the usefulness of such an approach. We emerged from the session with some old ideas, some new ideas, some contacts to pursue, and some priorities to consider. The next step was to reformulate our framework and to gather more information concerning possible alternatives.

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*See: Palmour, V.E., Bellassai, M.C. and DeWath, N.V. A Planning Process for Public Libraries. ALA, Chicago, 1980.

### 7.1.2 SOLINET (Southeastern Library Network, Inc.)

The Southeastern Library Network, Inc. (SOLINET) is one of twenty-three regional networks that contract with OCLC* to provide services to their member libraries. SOLINET covers the states of Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Louisiana, Mississippi, and Florida, and is therefore a potential participant in statewide library networking activities in North Carolina. SOLINET attracted considerable attention in October 1981 with a significant reducing of its staff. The controversy surrounded the widely promoted Regional Support System (RSS). This system is essentially a stand-alone regional catalog utilizing the Washington Library Network (WLN) software. The RSS project has a long, complex history. SOLINET had first to fight for the right to recycle records contributed to the OCLC database by SOLINET members. SOLINET had been a key protagonist in lengthy debates about third party use [10] and claimed a major victory when OCLC reluctantly agreed to allow third party use. However, relations between the two organizations deteriorated when "OCLC refused to allow SOLINET to hook its communications line into a remote communications processor installed by OCLC at SOLINET's Atlanta headquarters" [11]. In spite of their differences both organizations signed a memorandum of understanding which committed them to work together [12]. Subsequent negotiation led to a $500,000 loan to SOLINET by OCLC for the improvement of OCLC services to SOLINET members. SOLINET encountered further difficulties which led to a reduction of staff (23 people) and a reassessment of the RSS development effort. It was rumored for some while that the project had been abandoned. However, SOLINET did in fact continue into field testing as planned, although the field test was subject to some delay.

The effects of these upheavals and uncertainties at SOLINET on the services to its membership was cause for concern in North Carolina. A task of this project was dedicated to a special investigation of the "potential services available from SOLINET and the Regional Support System in order to determine which components are feasible for replication in North Carolina, the time frame necessary for implementation, the resources required, and their cost."

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*Online Computer Library Center formerly Ohio Colleges Library Center

A visit to SOLINET headquarters was planned and postponed several times for two reasons. The first related to the continued delay of the start of the RSS field testing (we wanted to obtain some feedback from the State Library, which was the only North Carolina library participating in the trial, prior to the visit). The second reason for the delay was the sudden departure of the Executive Director of SOLINET, Lee Handley. Although the new director, Frank Grishom, was appointed soon after, his appointment was effective as of July 1st and we were unable to discuss the North Carolina concerns with him. Nevertheless, a one-day visit to SOLINET in Atlanta was made April 12th, and discussions were held mainly with Randall Cravey, Manager, System Development and Acting Director, and Michele Delahite, Library System Programmer/Analyst.

The discussions focused primarily on the RSS developments. A set of implementation decisions was made over the period March 1979 through November 1981 which resulted in a group of initial system offerings. This set of offerings is known by the name LAMBDA (Local Access and Management of Bibliographic Data Authorities). It was not designed to displace or directly compete with other service programs at various levels (national, state or local), but to complement them. The use of LAMBDA is not mandatory for SOLINET members.

The RSS project focused on development of a general set of capabilities involving creation, management and flexible online access to a bibliographic data base at the regional level. It is anticipated (by SOLINET and by others developing similar systems) that as local library systems become more common, the regional system will evolve into one whose function will be almost exclusively the support of various local library systems in a distributed network structure.

LAMBDA offers several capabilities to assist an individual library in the management of bibliographic, authority, and holdings data. These capabilities are:

- Storage of, and access to, institution bibliographic and authority data generated from the load of institution machine-readable records.

- Online updating of institution bibliographic and authority data.

- Storage of and access to detailed holdings records generated from the load of institution machine-readable records and fror online input.

- Online updating of institution detailed holdings data.

- Storage of and access to a resource database of bibliographic records created by the union of all participating libraries.

- Storage of and access to a resource database of authority records created from the LC-MARC name and subject authority files and the headings generated from the participating libraries' bibliographic records.

- Online updating of resource bibliographic and authority data.

- Access to summary holdings information via the resource database.

- Creation of offline products such as printed bibliographies and authority lists, machine-readable tapes, and COM catalog print tapes.

The capabilities described above may be combined in various ways to support a variety of services. The services are:

- Institution Database Management
- Authority Control
- Reference Support

Institution Database Management

Institution Database Management provides online file management through access to an institution's own machine-readable database. This service can be used to create and maintain an institution database in preparation for or in addition to utilizing local online capabilities. Until local hardware

resources are available, a library can manage its data by having access to its own local records via the network computer facilities. While a library is utilizing this service, bibliographic information and detailed holdings can be retrieved through a variety of access points and can be updated online. In addition, on-demand copies of an institution's database can be produced for COM catalog production or other related services.

Authority Control

Authority Control is an optional service which provides linkages between authorized headings (name, subject. series, and uniform title) and bibliograpic records. This service is used to control access and to improve maintenance of bibliographic records by allowing online access to and update of headings. As with Institution Database Management, participants may access this service via network computer facilities until such time as local resources are available. A union authority file allows participants to share the responsibility and benefits of heading maintenance while also retaining a capability to store, access, and update local headings if desired.

Reference Support

Reference Support provides searching capability via access methods such as keywords, Boolean connectors, and subject search to an online database of bibliographic and authority records. Those institutions participating in Institution Database Management will have access to both the union (resource) database and their own records. Those not participating in Institution Database Management will have access to the resource database only. Access capabilities include OCLC number, LCCN, ISBN, and ISSN, as well as names, title and corporate/conference name keywords, series, subjects. and uniform titles.

The modules of the system that make these services possible are Authority Control, Inquiry and Input/Edit. The features include: linkage of bibliographic and authority headings; access capabilities such as key word searches and Boolean connectors; a variety of display formats; and online editing procedures which allow workflow control of the records being processed.

Preceding the module descriptions are sections dealing with data base structure, creation and content.

The LAMBDA concept is not new. (In fact, the LAMBDA software is a rewritten version of the WLN software). It is one of a group of systems currently under development which will complement the services traditionally available from OCLC and, potentially, from RLIN. We described our perception of the roles of such systems in library networking activities in Section 2 of this report. Here, we will briefly consider SOLINET's philosophy underlying the development and continued support of LAMBDA. The primary motivation for establishing the regional level database is the "80-20 rule", by which it is considered that 80 percent of all transactions can be satisfied at the regional level. The assumption then is that the regional system can process these transactions more efficiently then the higher level (national) system. Certainly, communications costs will be lower with a local system but the other performance criteria, such as response time, proportion of satisfied requests to the database etc. is a function of the size and content of the database, and the capacity and speed of the equipment housing the system.

The LAMBDA system is organized around several files. The three main files are:

- bibliographic file (containing the MARC records organized by OCLC number)
- authority file (containing headings actually used in the database, organized by headings)
- detailed holdings file (containing local item specific information, organized by institution).

Libraries subscribing to the LAMBDA service will have the option of four levels of database input (at differing prices):

- Full bibliographic record plus holdings information is stored for each item input. If a union (resource) record does not exist in the database one is created from the input record and a copy of it is made for the inputting library.

- Full bibliographic record is only stored for an individual library if local subject headings are used (690 & 691 field). Otherwise the detailed holdings information is linked to the union record.

- Detailed holdings information is linked to the union record. If no union record exists, then it is created from the input record and the inputting library's holdings information linked to it.

- No detailed holdings are stored but a holdings symbol is linked to the union record.

The projected prices for the LAMBDA services are given in Table 7.1.

The North Carolina State Library is the only library in the state, and the only state library, to participate in the LAMBDA field test. Altogether eleven libraries were involved, resulting in the network configuration displayed in Figure 7-1. The network supports a mix of OCLC terminals and Burroughs terminals.

The test period began on April 1, 1982 and was scheduled to run for three months. However, SOLINET recently extended the test period for a further two months. As of the end of June the North Carolina State Library had about 70 percent of its OCLC data base loaded into LAMBDA (i.e. approximately 86,699 records out of a total of 125,000). The cost of using the system during the period was 20¢ per record plus $1,500 in communications charges (based on a $6,000 p. a. charge). Records were reviewed in the data base at a rate of approximately 1,000 per week. Retrospective conversion records are reviewed at the rate of approximately 20-40 per hour.

TABLE 7-1. SAMPLE LAMBDA COSTS

The following models are presented for comparative purposes. The models do not include data communications expenses.

MODEL I (Public Library)

Assume:

33,000 titles; 165,000 locations (33K titles x 5 copies/title);

10,000 Detailed Holdings modifications per year.

| | Full Rcds. | Linkage Rcds. | Linkage/No Ref. |
|---|---|---|---|
| Bib. Option | $ 6,336 A. | $ 4,356 C. | $ 4,356 C. |
| DH Storage | 1,980 E. | 1,980 E. | 1,980 E. |
| DH Maint. | 500 F. | 500 F. | 500 F. |
| Auth. Control | 673 H. | 673 H. | 673 H. |
| Ref. Support | 1,200 I. | 1,200 I. | - |
| | $10,689 | $ 8,709 | $ 7,509 |
| | $.324/title | $.263/title | $.228/title |

MODEL II (Academic Library)

Assume:

100,000 titles; 150,000 locations (100k titles x 1.5 copies/title);

10,000 Detailed Holdings modifications per year.

| | Full Rcds. | Linkage Rcds. | Linkage/No. Ref. |
|---|---|---|---|
| Bib. Option | $19,200 A. | $13,200 C. | $13,200 C. |
| DH Storage | 1,800 E. | 1,800 E. | 1,800 E. |
| DH Maint. | 500 F. | 500 F. | 500 F. |
| Auth. Control | 2,040 H. | 2,040 H. | 2,040 H. |
| Ref. Support | 1,200 I. | 1,200 I. | - |
| | $24,740 | $18,740 | $17,540 |
| | $.247/title | $.187/title | $.175/title |

Source: SOLINET

| | Library | # Recs. |
|---|---|---|
| EMU | Emory U. GA | 130,000 |
| EMM | Emory Medical GA | 15,000 |
| GSU | Georgia State U. GA | 160,000 |
| TTU | Tenn. Tech. TN | 86,500 |
| FHM | U. of So. Florida FL | 400,000 |
| MJP | Jackson Metro. Public MS | 80,000 |
| PQG | U. of Miami FL | 250,000 |
| VGM | George Mason VA | 70,000 |
| NCS | NC State Library NC | 125,000 |
| ORN | Oak Ridge Natl. Laboratory TN | 25,000 |
| KLG | U. of Louisville KY | 145,000 |
| | | 1,484,500 |

Figure 7-1. LAMBDA Field Test Network Configuration

entered into the database. A series of five demonstrations of the system were given to librarians in the state which were very successful, and the general impression of the test was that it was a valuable experience for all who were directly involved with the system.

There are several ways that the LAMBDA types of systems can be used to supplement the OCLC/RLIN services. They can be operated, as in the field test, by a regional network; or they can be operated at the state level as part of a state network; or they can be further decentralized to serve regions within states (which is consistent with our notion of ZOCs). One feasible alternative for North Carolina is the establishment of a system like LAMBDA to serve libraries within the state. Individual libraries would interact with the system either directly, or indirectly through a processing center. Transactions that cannot be serviced at the state level will be passed onto OCLC for processing.

### 7.1.3 OCLC

OCLC was founded in 1967 by the Ohio College Library Center. In 1977, in conjunction with a change in the corporation's governance, the name was changed to OCLC, Inc., and in 1981 to OCLC Online Computer Library Center, Inc. OCLC is a not-for-profit computer library service and research organization based in Dublin, Ohio. The center operates an international network that libraries can use to acquire and catalog books and other materials, order custom printed catalog cards, arrange interlibrary loans, and maintain location information on library materials.

In addition to supporting shared cataloging and producing catalog cards, OCLC now supports acquisitions of monographs and serials, funds accounting, a shared name-address directory of suppliers, serials check-in, some management reports, and production of union lists of serials. OCLC is a useful tool for online pre-order searching since the presence of a library's locator symbol in a record indicates that a title is owned. However, the use of OCLC as an online catalog is limited by the fact that the bibliographic record contains a single call number, the one used at the library which entered the cataloging data into the system. The OCLC acquisitions subsystem became

operational in 1981. OCLC mails the orders directly to vendors in most cases; however, libraries may specify receipt of particular categories of orders which require attachment of additional procurement documentation before the orders are forwarded to the suppliers. One of the planned enhancements to the subsystem is online transmission of orders to selected suppliers.

A limited number of libraries use the OCLC serials check-in subsystem. The claiming function may be available some time in 1983, and a date for completion of the binding control function has not been set. The National Agricultural Library (NAL) has been using the serials check-in subsystem for approximately five years. The major advantage to NAL in using the subsystem is that the check-in records are available online for search-only access by agricultural libraries across the nation. These libraries search OCLC to determine if NAL has received the serial issue that they are seeking on interlibrary loan; therefore, the serials check-in system actually reduces the number of unfillable loan requests that NAL must process. NAL staff indicated that online check-in in the OCLC subsystem takes longer than manual check-in, but that the reduction in loan processing makes the extra expenditure of time for check-in to be cost-effective in the overall operation of the library.

The Union Listing capability of the serials subsystem could be useful to North Carolina libraries in that it enables listings to be created, maintained and distributed. Libraries enter summary holdings information into serial local data records. This information is used in Union List displays which are accessible to all Serials Control Subsystem users. The Union List capability supports interlibrary loan activities for serials. Serials local data records may include Union Listing summary holdings statements for any group of libraries (constituting a ZOC, or for the entire state) and for individual libraries within these groups. These listings can be printed on request. Such a facility promotes the flexibility of networking and should be seriously considered by libraries in the state as a basis for interlibrary loan of serials.

During our visit to OCLC at the beginning of June, we were given planned release dates for various impending system enhancements. They are:

- August 1982 — Serials union listing capability
- January 1983 — Serials claiming capability
- April 1983 — Direct transmission of orders to publishers and vendors.

We made a one-day visit to OCLC headquarters in Dublin, Ohio, at the beginning of June, 1982. Prior to our visit, we sent a copy of some of the background materials on the study and asked that the following topics be addressed during the course of our discussion:

- future plans---including expansion of services, new membership categories, etc.
- pricing policies---for all categories of membership from individual libraries through to regional networks
- organizational relationships with the regional and state networks with special emphasis on SOLINET and a potential North Carolina state network
- cooperation and relationships with other utilities
- policies for system growth.

Arrangements were made for us to meet with the following people:

Phil Schieber, Public Relations Manager
Dave Penniman, Vice President, Planning and Research, and Director, Development Division
Ken Harris, Vice President, Marketing and User Services
Don Bogart, Manager, Local Library Systems
Mary Ellen Jacob, Director for Library Planning
Paul Schrank, Vice President, Membership and Corporate Relations
Thompson Little, Senior Vice President, Online Operations
Neal Kaske, Director for Research
Jim Barrentine, Director for Technical Planning
Rowland Brown, President

The discussions focussed on three major topics: the new areas into which OCLC plans to expand, the provision of services to small libraries, and policies for system growth in terms of additional users and database growth.

There are two main development areas for OCLC. They are the intermediary types of integrated library automation systems which complement the traditional cataloging services available from the cataloging utilities and microcomputers. OCLC is currently involved with two systems of the first kind, and one of the latter.

OCLC has begun in-house development of a minicomputer-based integrated library automation system, the Local Library System (LLS), that will support technical processing, an online catalog, and circulation control. Details of the system and projected dates for availability have not been released. According to OCLC, the system will be better integrated and contain more special features than the Claremont system which OCLC is currently marketing.

The computer hardware that will support the system has not yet been selected, although the choice has been narrowed down to five manufacturers:

Data General
Hewlett Packard
Harris
Digital Equipment
Wang

The decision will be made by OCLC at the end of July.

The Claremont system is a minicomputer-based turnkey library automation system developed by the Libraries of the Claremont (California) colleges. The system currently supports acquisitions of monographs and serials, funds accounting, an online catalog, and circulation. The system terminals are hard wired to the OCLC terminal to provide linkage between the two systems. Report parameters may be specified by the librarian since the data base query language provides for flexibility of output. Serials check-in can be performed using the acquisitions module's capability to record receipt of individual volumes. However, the orders for serials as well as the related receipt information currently cannot be read out onto a tape for retention

when the acquisitions file is purged periodically. The acquisitions module is not yet linked to the catalog module, so data transfer involves re-keying. The special search capabilities in the online catalog module include searching by subject, by call number, or by using partial Boolean operators to combine keywords from the author or title fields with subject headings.

TLS operates on the Hewlett-Packard 3000 series minicomputers. The six libraries of the Claremont Colleges and the Ontario Public Library are the current users of the system. OCLC has an agreement with Claremont to market TLS for three years, with an option to renew. OCLC probably will continue to market the system and will provide transition support for libraries who wish to change to OCLC's proposed Local Library System from TLS or another system.

In addition to the TLS and LLS, OCLC is planning a totally new product: a stand-alone microcomputer which can act as a full OCLC terminal as well as support other functions (such as word processing, accounting, etc.). The decision has not yet been made as to the choice of microcomputer hardware, but it will have a 16 bit CPU, industry compatible bus, and run a standard operating system like UNIX, CP/M, etc. System specification and vendor selection is expected to be complete by August 1982, and production quantities available in October 1983. Similar in concept to the above development is a project to develop library related software for popular microcomputers, particularly the TRS-80 model II and the Apple II. One of the proposed applications is to make these microcomputers appear to be full OCLC terminals.

These two new ventures of OCLC are an indication of their commitment to smaller libraries, in terms of lower cost hardware products. This commitment is seen again in their plans to adapt their existing leased line synchronous network to support both dial-up and OCLC terminals by using protocol converters. The converters would be sited at a dedicated OCLC terminal, and libraries within a 20-mile radius could dial-in to the network. Each converter could support 4-16 simultaneous users. The third indication (and probably, according to some, the ultimate indication) will be changes in pricing structure. We discussed this at length with several of the people

we visited. Although we were not given any specific information concerning pricing plans, we were told of a tendency to shift the distribution of charges from the first time use charge (FTU) to searching.

A considerable investment in OCLC (via SOLINET) has been made by North Carolina libraries. A recent* estimate of the records input to date into the OCLC data base is of the order of 1.7 million (2.1 million transactions, with 15 percent re-use). The percentage of overlapping titles is not known. Since the cost of inputting a single record into OCLC varies from $5.31 to $10.35, this represents a minimum** financial investment to date of between $9 million and $17.6 million. OCLC (and SOLINET) are already significant participants in the North Carolina library community. We intend to help the libraries in North Carolina build on this not insignificant investment and recoup increased benefits from it.

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* June 1981 - estimate obtained from SOLINET.

**The per transaction cost estimates do not include costs of terminals, modems, furniture, training, space, maintenance, communications.

### 7.1.4 DataPhase

The selection of DataPhase as the vendor for equipment related to the Public Library Networking Plan (see p. 45 for a description) is the reason for our focussing on DataPhase more than on other vendors. In particular, concerns about the performance of DataPhase systems, and the stability of the company itself have been raised recently. As a consequence, an additional task was appended to the statement of work. The objective of this additional task was to investigate the technical feasibility of continuing with the PLNP and its relationship to multitype library networking in the state.

In order to make recommendations concerning the plan, we arranged to visit the two existing DataPhase installations in North Carolina (at the public libraries of Greensboro and Charlotte-Mecklenburg County), installations outside the state (Fairfax County, Virginia; Harford County, Maryland and Chicago Public Library), and the DataPhase headquarters in Kansas City.

The DataPhase systems that are installed in North Carolina are ALIS I systems (Automated Library Information System). This system was the first DataPhase product and is no longer being developed by DataPhase. Instead DataPhase introduced ALIS II, a more powerful system than ALIS I, which is still being fully supported and enhanced.

There are two versions of ALIS II (ALIS II/S and ALIS II/E). ALIS II/S is upwards compatible from ALIS I, in other words a library can move from an ALIS I system to an ALIS II/S system without changing the hardware. ALIS II/S is available on the Data General Nova 4-X Systems and IBM Series 1 minicomputers. DataPhase plans to convert all ALIS I libraries to ALIS II/S over the next 12 or so months. The scheduling of libraries for conversion is the responsibility of the DataPhase User Group Executive Committee. The first pilot upgrade is scheduled to begin in August 1982.

ALIS II/E is DataPhase's latest product and uses the highly flexible multiprocessor capability provided by Tandem computers. The Tandem system has a very large potential capacity - up to 16 processors supporting over 500 simultaneous terminals. The most significant feature of ALIS II/E is that it is

incompatible with the other versions of ALIS. In order to switch from ALIS I or ALIS II/S to ALIS II/E, a complete change of hardware is required. (Software and terminals will be swapped by DataPhase, but processors will not.) The ALIS I libraries in North Carolina must consider direct upgrade from ALIS I to ALIS II/E as an alternative to moving from ALIS I to ALIS II/S.

The additional features of ALIS II over ALIS I are:

- acquisitions
- materials booking
- public access catalog
- authority control and maintenance
- inventory control
- COM support.

It is worth noting at this point that not all of the above mentioned features of ALIS II are currently available. They are planned features. The features that will only be supported on ALIS II/E are serials check-in and keyword searching.

In addition to the planned developments of ALIS II/S and ALIS II/E DataPhase is moving into the microcomputer applications area. They are currently developing a microcomputer system which will interface with ALIS II to provide the following types of capability:

- intelligent backup in case of system failure (will replace current cassettes backup)
- direct access to THE SOURCE*
- preprogrammable log-in protocols which enable users to access systems it is programmed to access from a single function key.

The ultimate goal for this microcomputer product is that it will run a stripped-down version of ALIS II supporting four to eight terminals.

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* THE SOURCE is a timesharing computer service available to home terminal and microcomputer users.

One further area DataPhase wishes to expand into is retrospective conversion. However, to date, they have not made many overtures in this direction except to hold some preliminary discussions with Blackwell-North America (BNA).

Two points of interest for this study emerged from discussions with libraries at other DataPhase sites. One relates to the performance of the system, and of DataPhase as a company. The Fairfax County Public Library System acquired an ALIS I system in 1979. Since going online, Fairfax County has experienced severe performance problems. The most obvious cause of this was insufficient disk space in the system as initially configured (by DataPhase). This same problem has been experienced by several DataPhase users including the two North Carolina sites. DataPhase recently reorganized the Fairfax County bibliographic file which improved the response times of the system, but further measures have had to be taken to make the system a viable operation in the Fairfax County environment. First, only six of the eighteen branches that are online can perform retrospective conversion simultaneously. Second, a delayed filing of circulation transactions every 24 hours has recently been implemented. The transactions are stored in a transaction file and run against the main file at close of business each day. The seemingly persistent underconfiguration of system by DataPhase does not inspire great confidence.

The Chicago Public Library System has been experiencing problems of a different sort. They are acting as a "guinea-pig" for the ALIS II/E system. Chicago will be the first ALIS II/E site and will initially support 150 terminals simultaneously. The telecommunications system was custom designed to handle a large number of terminals. To date, the ALIS II/E software has not been formally delivered (it is 9 months behind schedule). The currently scheduled delivery date is September 15th, 1982 after which, if the system is not signed over, DataPhase will incur a late delivery penalty.

DataPhase has, in the last couple of weeks, had its own internal problems. DataPhase seems to have had its resources (cash flow and personnel) fully stretched by its recent growth and its commitment to a new system. How long this is likely to last is uncertain, particularly in the light of the most recent developments.

During the weekend of 26-27 June 1982, both co-founders of DataPhase resigned from the company---Sheldon Roufa, President and Elvin Smith, Vice President. A new president, Paul Rosenberg, was named on Monday, June 29th. How such a change will affect policy, future directions, old commitments, etc., is difficult to determine. No information is forthcoming from DataPhase except that "nothing significant will change". Nevertheless, we are glad to be able to consider this news prior to making recommendations to libraries in North Carolina.

On a positive note,* the third DataPhase installation we contacted had successfully experimented with its ALIS II system (Harford County, Maryland). The experiment investigated the possibility of dial-up access between the various automated circulation control systems in Maryland libraries (so far, six public library systems in Maryland have purchased automated circulation systems). The first system to be accessed using the ALIS II/S terminal was the Baltimore County CLSI system (see page 109 for brief description of the CLSI system). Since title search was the only file available for Baltimore County branches to search, it was the only file that could be accessed by Harford County. The ALIS II/S terminal became, in effect, a Baltimore County branch to the CLSI system. This level of access was very primitive, operating at 300 baud** via an RS 232 interface. The experiment was continued with the Maryland Interlibrary Loan (MILO) system headquartered at the Enoch Pratt Free Library gaining access from their CLSI terminal to the Harford County's ALIS II/S system. MILO has been able to access the system frequently searching the files by title, subject and author. The CLSI system at Towson State University has also been accessed successfully. Finally, the Montgomery County Public Library's Systems Control circulation system was accessed. Future prospects include Harford Community College's IBM system and CLSI systems in Prince George's County and Howard County.

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* We do not wish to imply that all DataPhase installations are experiencing problems. Several are running their operations without difficulty. However, in analyzing systems one must thoroughly investigate weak spots which could be critical in an operational environment.

**300 baud = approximately 30 characters per second transmission rate.

As a member of Cooperating Libraries of Central Maryland (CLCM), Harford County has distributed, to CLCM libraries, instructions for dial-up access to their DataPhase system and has provided a special password for this purpose. A dedicated dial-up port is also being investigated. A CLCM task force (coordinated by Jo Ann Pinder) has been established to explore reciprocal dial-access and to maximize the effectiveness of this low-level capability by appreciating procedural complexities involved when working with a diverse group of libraries. With inter-system cooperation it is hoped that delinquent patron information will be made available and thus curtail "crossover patrons" who misuse borrowing privileges.

A number of problems arising from increased access to holdings information are anticipated by Harford County as interlibrary loans increase:

- who has first rights to a given item---the local patron or the remote patron who requested the book some time previously?
- how can systems be monitored for conformance with ILL guidelines?
- if direct loaning becomes commonplace, should state aid formulas for subsidizing ILL be revised?
- libraries not accustomed to loaning are faced with the problem of being visibly excluded from ILL because of unwillingness or inability to allow access.

The Harford County experience is encouraging for public libraries in North Carolina. Certainly, dial access to the circulation control file and public access catalog modules (when available) is primitive (the target system must be searched using the procedures and language of the target system), but it is a start. Among other projects which are attempting more sophisticated levels of access is the Irving Project in Boulder, Colorado.

The fact that some level of access can be provided, however crude, means that a mix of circulation control systems in public libraries (or in any libraries) does not preclude shared access.

7.1.5 The Future with SOLINET, OCLC, and DataPhase

In our development of alternatives for networking in North Carolina, we must make some judgements about the future, especially those concerning sources of systems and/or services. These sources of relevance to North Carolina libraries are SOLINET, OCLC, and DataPhase.

SOLINET and OCLC are related organizations and can, therefore, be considered together. The major concerns we have about SOLINET center around their large scale investment in the development of the Regional Support System, of which LAMBDA is the first product. SOLINET began to meet problems over its financial relationship with OCLC. SOLINET, however, had contracted with Burroughs for hardware and system development (including conversion of the WLN software to run on Burroughs equipment). The total cost of the hardware procurement and the software development is of the order of millions of dollars which needs somehow to be recouped by SOLINET, through sales of the LAMBDA system and/or provision of services based on it. The pricing strategy that SOLINET selects for LAMBDA is, therefore, critical. A brief look at the cost calculator issued in June, by SOLINET seems to indicate that the cost of the LAMBDA services over and above the costs of the SOLINET/OCLC cataloging costs are between 17 and 35 cents per title, depending on the level of service, volume of input and selection of options. It would appear that LAMBDA could provide the storage and retrieval facilities for a state union catalog, with interlibrary loan item and location identification plus reference service being supported by the union catalog. The economic considerations focus on the difference in cost between using the OCLC ILL subsystem and the LAMBDA storage costs plus reference support. Currently, LAMBDA does not support the placement of ILL requests online, but SOLINET does plan to add that capability.

It is not certain yet whether SOLINET will continue its development of LAMBDA. The decision could be made to continue full development as originally planned, to develop the system only partially, to operate the system as it stands today, or to drop the entire project. We anticipate that a policy decision will be made in the next months or so by the SOLINET board. The concept of LAMBDA

is sound, but other alternatives do exist, including the WLN system itself, and developments of a similar type, e.g., the OCLC Local Library System (LLS), ILS, etc. One of the key advantages of the LAMBDA system over others of the same type lies in its direct relationship to the OCLC system. Transactions not satisfied by the LAMBDA system can be transmitted directly to OCLC.

We feel that it is very important for libraries in North Carolina to monitor the imminent decision-making and policy formulation of the SOLINET board. However, the future of networking in North Carolina is not totally dependent on these decisions and policies and should not be held back until their announcement.

The future with OCLC is somewhat more well-defined. OCLC will continue to expand its range of services, and its client base to include smaller libraries. The recent move to the new Dublin headquarters caused serious performance problems on the system. Computers are highly sensitive to movement and the long periods of down-time and slow response rates were largely caused by the move. A different critical point will be reached in approximately 18 months time. One of the topics we discussed with OCLC was its policy for system growth. At that time, OCLC's Tandem Computer Configuration will be at its capacity as far as disk space and processor configuration are concerned. Decisions will have to be made about the database and how it will be segmented. Such decisions will be critical to all OCLC users. There are a number of different ways the database could be segmented including least vs. most used, by date of input, etc. The most probable solution is to set up high use databases, which satisfy approximately 80 percent of cataloging transactions, serving different time zones (e.g., an East time zone high use database and a West time zone high use database). These databases would be supplemented by a low use database (containing the remaining records) which would be common to both.

Another alternative is for OCLC to distribute the database on a regional or state basis using LAMBDA-type systems and then acting as a switching mechanism for the transactions that are not satisfied from the regional or state database. OCLC is certainly moving in this direction themselves through their development of LLS.

Yet a third growth area to consider is the addition of terminals that can be supported by the OCLC network. At present, the maximum rate at which terminals can be added is between 75 and 100 per month. If OCLC is moving into the small library area, then there will be a significantly increased demand for membership causing even lengthier delays in obtaining terminals and going online. To avoid this potential frustration point there are two actions that can be taken in North Carolina. One is to phase-in to the OCLC system (we will discuss a phased approach to implementation in Section 10). The second action is to approach OCLC as a state and present a detailed plan for automation to them. OCLC indicated to us that they could add terminals at a faster rate than they currently achieve if sufficient advance notification is given. Some of the difficulties with terminals (manufactured and supplied by RAMTEK) that have been experienced will soon be alleviated. OCLC has come to an agreement with Beehive to supply terminals as an interim measure until their own new in-house terminal development is completed.

We feel very strongly that OCLC has and will continue, to provide the foundations on which library networking in North Carolina can be built. The investment to date of North Carolina libraries in OCLC is substantial and should not go to waste. This investment taken together with recent agreements between RLIN and OCLC, the nature of the OCLC databases as opposed to the RLIN database, and the serious system failures at RLIN over recent months, all make OCLC the primary choice for libraries in North Carolina.

The future with DataPhase is equally as uncertain as with those sources discussed above. This is especially so since the changes in senior managment. It would be unlikely that DataPhase would fail to continue to support its ALIS II/S and ALIS II/E products, but the level of commitment and the direction of future developments could certainly change. Once again, we feel that and announcements concerning policy, etc., should be carefully monitored, although, as we discuss later in Section 9, it is extremely difficult to recommend that a large group of libraries make themselves totally dependent (for major procedures) on a system vendor whose organizational structure is unsettled.

This networking feasibility study is being conducted at a particularly opportune time. Automated library systems are reaching a new level of sophistication, and a number of the system vendors are in a state of flux. The libraries of North Carolina have a chance to build on current strengths in the field and to discard weaker components. The alternatives we consider feasible reflect this attitude and none of our recommendations makes libraries in North Carolina totally dependent on the others. That is not to say that we do not recommend use of the others, but that the dependency not be total, as other alternatives do exist. The next subsection briefly considers some other available sources.

### 7.1.6 Other Relevant Systems

#### UTLAS

The University of Toronto Library Automation Systems (UTLAS) is a major Canadian bibliographic utility. In addition to supporting shared cataloging, UTLAS also supports an online authority control system on its central computers. Since 1975, UTLAS has been working toward the development of a fully integrated distributed processing network. The minicomputer-based Library Collection Management System (LCMS) may function either as a stand-alone minicomputer system or as an integral part of the UTLAS centralized network. LCMS currently supports an online catalog and a circulation module; a highly flexible statistical facility is available to produce both standard and customized management reports. Planned system enhancements include acquisitions (Summer, 1982), funds accounting (mid-1983), and serials control (1983). At present, no interface is planned between LCMS and OCLC.

LCMS operates on Data General's Eclipse S/140/250 series minicomputers and on its microNOVA MP 100/200 Series microcomputers. The Rochester (N.Y.) Institute of Technology is the only user of the system in the U.S. UTLAS has recently completed an agreement with a Japanese firm who will market LMCS in Japan.

#### WLN

The Washington Library Network (WLN) is a bibliographic utility serving the northwestern region of the U.S. and western Canada. WLN is the only American bibliographic utility with a linked authority control system, so it is relatively easy to make changes to MARC formats in implementing AACR2. In addition to supporting shared cataloging and authority control on its central computers, WLN offers its network users an acquisitions system, including funds accounting and serials ordering. An online catalog should be available to network users in the near future. The high-level systems software package provides for great flexibility in

allowing users to establish their own reporting parameters. The DataPhase circulation system (described on page 97). is operationally compatible with WLN. The total WLN software package is available for purchase from WLN.

A commercial firm, Biblio-Techniques, also markets the WLN software under the name BLIS (Biblio-Techniques Library Information System). The system is available both as a software package and as a turnkey system. Currently the system operates on mainframe computers, but testing is underway to provide for operation on a large minicomputer system. An online catalog has been developed as an enhancement to the WLN software. OCLC tapes or MARC tapes may be used to create the data base, and WLN network users have the capability to transfer bibliographic data online. A circulation system is under development and is expected to be available before the end of 1983. No plans currently exist for creation of a serials module for check-in and binding control.

Users of the WLN software include the National Library of Australia and its network of Australian libraries, the University of Illinois, and the University of Missouri. The University of California at San Diego currently is testing the system.

Vendor-Supplied Systems

Advanced Data Management, Inc.

The Bibliotech library system was designed specifically for special libraries that need in-depth access to their own collections. These libraries often are corporate libraries with holdings which are proprietary in nature; therefore, the libraries do not participate in networks for interlibrary lending and other cooperative activities. The primary purpose of the system design is to support the information needs of the corporation's staff; in addition, the system supports many of the clerical functions of operating a library.

Bibliotech currently offers online cataloging, an online catalog, and a circulation system. Boolean searching is available, as well as searching for individual words in subject headings and in abstracts. An authority control module

is operational. Special reports may be designed and generated by library staff since Bibliotech is based on a data base management system. The system is reported to be user-friendly. Acquisitions and serials control modules are expected to be completed by the end of 1982. The system operates on the Digital Equipment Corporation's PDP-11 series.

Bibliotech does not support the MARC format for bibliographic records, since its user group of special libraries does not require use of that format. If required, full MARC records could be stored on tape, and software could be developed to provide an interface to the bibliographic file. Currently, no interface exists between Bibliotech and OCLC or RLIN; a future system enhancement will enable libraries to extract records from the files of national bibliographic utilities.

Bibliotech is offered as a software package only, but marketing it as a turnkey system is planned in the near future.

Carlyle

Carlyle Systems, Inc. is a recent entrant into the library automation field. Carlyle offers regionally based computerized services that an individual library or a group of libraries can use with a minimal investment in hardware and software. Carlyle's latest development is an agreement with Geac International (see page110) to link the latter's online circulation system with Carlyle's online catalog service. The Geac minicomputer will be able to access the Carlyle computer (Magnusen IBM plug-compatible machine comparable to the IBM 4341).

CLASS

The California Library Authority for Systems and Services (CLASS) is of interest because of its microcomputer-based serials control system, Checkmate. Using a TRS-80 Model II microcomputer, Checkmate supports on-line check-in,

claiming, routing, and accounting; creates subscription alert reports; and produces alphabetical title and subject lists. Special features of the system include:

- Keyword searching using Boolean operators
- Flexibility to accommodate individual needs
- Variable record lengths
- Automatic file scan to locate late or missing issues
- Prompted data entry
- User-selectable record print formats
- User-defined indexing
- Built-in stop word list which is user-modifiable
- MARC-like or user-defined field tapes
- Addition and deletion of temporary rates to any record
- File security

A second system of potential interest to North Carolina is that used to produce the California Union List of Periodicals (CULP). The system operates on a Data General minicomputer and produces the union list in hard copy or COM. Subsets can be produced with current holdings information as requested by individual libraries, or by groups of libraries (ZOCs). As yet, the system has only been used in-house but we have approached CLASS for a rough indication of the price they would set if they were to make it commercially available.

Cincinnati Electronics

The CLASSIC library automation system currently consists of a circulation module with a direct interface with OCLC for transfer of a library's cataloging data into the system. A special feature of the circulation module is interlibrary loan record keeping for copyright control. Full MARC records can be handled by the system. The data base query language allows for report generation by library personnel for non-standard reports. A word processing package is also available. The system operates on the Univac V77 series of minicomputers.

The acquisitions module is scheduled for completion in late 1982; it is based on an acquisitions system package purchased from Duke University. The acquisition of all types of library materials, including serials, will be handled by the acquisitions module. Serials check-in and other aspects of serials control are scheduled for completion by Summer, 1983. An online catalog module with subject access will be available early in 1983. The Boolean Search capability has been developed already.

Users include the State of Wyoming State Library System with a statewide circulation system, and the Riverbend (Illinois) Library System which includes several public library systems and a corporate library.

CL Systems, Inc. (CLSI)

At present, the LIBS 100 library automation system consists of an online catalog and a circulation module. Online interface with OCLC is available with use of a package developed by Innovative Interfaces, Inc.; interfaces with RLN, UTLAS, and WLN are being developed. A partial MARC record is transferred from the bibliographic utility to the LIBS 100 system; acceptance of a full MARC record is planned for a future software release. Both Boolean searching and authority control are expected to be operational before the end of 1982. Currently the acquisitions module is undergoing operational testing at two large library systems and should be ready for release by Summer, 1982. It will support single and standing orders and funds accounting; future enhancements will include connection to vendors for online ordering and vendor performance analysis. Serials control is scheduled for completion in 1983. A reports generator allowing librarians to develop reporting parameters online should be available by late 1982. One special feature offered in LIBS 100 is the Public Access Catalog, a terminal with a touch-sensitive screen which the public uses for searching the online catalog. The system operates on the Digital Equipment Corporation's PDP-11 Series minicomputers.

CLSI is the oldest and largest of the turnkey vendors. Over 400 libraries are users of the LIBS 100 system, including DOD's Uniformed Services University of the Health Sciences, the Department of Energy, the Department of Labor, the National Aeronautics and Space Administration, the D.C. Public Library System,

the University of the District of Columbia, and the National Institutes of Health Library (which recently signed a contract to obtain the system).

Gaylord Library Systems

Gaylord currently offers an automated circulation control system which has an online interface to OCLC. Management reports may be generated by the system. The system may be used online to request a title for loan from another branch. The library that is being asked to supply the material can send a message online to the requesting library to indicate whether the title will be supplied on loan. Technical processing modules (acquisitions and serials control) are expected to be ready for marketing by Summer, 1982. The acquisitions module will include ordering, funds accounting, and vendor performance analysis; direct access to vendors for online ordering will be a future enhancement to the system. The serials control module is based on a purchased software package which will be modified by Gaylord's in-house programmers. By late 1982 the system is scheduled to accept a full MARC record; it currently supports a partial record.

The system operates on a distributed basis. Stand-alone microprocessors (Apple Computers) process certain categories of data as part of daily library operations; at night other categories of data are processed by a mainframe computer and then downloaded to the microprocessors.

The Gaylord system is currently installed in twelve public library systems; the largest system is the Queensboro Public Library in New York City.

Geac

The Library Information System currently consists of an automated circulation module, an acquisitions module, and an online interface with OCLC. The acquisitions module is being revised; the new system will be tested in late 1982 and should be ready for general distribution in 1983. Acquisitions will support ordering for monographs and serials, funds accounting, currency rate changes, and a variety of management reports, including vendor performance analysis. An online

catalog with Boolean search capability should be available for release in 1982; the system will be able to support full MARC format. A serials control module is scheduled for release in 1983. An interface with RLIN is currently being developed, and interfaces with UTLAS and WLN are anticipated in the future.

The system operates on Geac minicomputers. Two versions of the system are offered based on library size. The Geac 6000 minicomputer supports the needs of small libraries, while the Geac 8000 supports large library systems.

System users include New York University, Yale University, the University of Southern California at Los Angeles, the Alexandria (Va.) Public Library, the City of London (England) Public Library, and a consortium of libraries in Connecticut.

Integrated Library System

The Integrated Library System (ILS) is a library automation software package under development by the Computer Technology Branch of the National Library of Medicine's Lister Hill National Center for Biomedical Communications (NIH/HHS). The software is designed to operate on Data General Corporation's Eclipse series, Digital Equipment Corporation's PDP-11, and IBM Series/1 minicomputers. Several options are available for obtaining ILS. The software and user documentation may be purchased from the National Technical Information Service (NTIS), but it is necessary for a library to have systems staff or a contractor provide the additional systems work required to install ILS at a particular site. Two recently-formed companies provide special services to libraries that select ILS to fulfill their automation needs. Online Computer Systems, Inc. offers ILS as a turnkey system, providing the necessary systems support both to start-up the system and to deal with future systems problems. In addition to providing ILS as a turnkey system, Avatar Systems, Inc. provides a service which is particularly beneficial to small libraries. ILS is marketed as a shared system operated on Avatar's centrally-located minicomputers, with each library having access to its own data.

ILS currently offers an online catalog, serials check-in and routing, circulation, an interface to OCLC for transfer of bibliographic data to the master

bibliographic file, and part of the authority control function. Each library may define which MARC tags and subfields it chooses to store locally. Some administrative reports are available. Future enhancements include acquisitions, full serials control, interlibrary loan, and a general report writing capability. Target dates are unavailable for completion of the enhancements due to budget uncertainties at the Lister Hill Center. Libraries may choose to obtain the planned enhancements and any other customized software by contracting for their development with Online Computer Systems, Inc., or with Avatar Systems, Inc.

ILS was installed at the Army Library, Pentagon, in mid-1980. The librarians had worked closely with the systems development staff at LHC in designing the system, and the Library was the actual test site for ILS. Circulation was the first module to become operational; serials check-in, the online catalog, and the authority file function were phased in later. Automation of acquisitions is the next item on the Library's priority list, but no dates have been established. Cards are still being filed in the card catalog, but the catalog will be closed this year.

At the time of a visit to the Army Library in January, 1982, the system was operating under software version 2.0 which needed some debugging. This new version of the software provided the library with online catalog access, a generalized patron registration form, and system acceptance of pre-printed labels or bar codes. The use of borrowers cards is supported by the system, but the Library had not yet implemented that feature. Software must be developed by the Lister Hill Center or a contractor in order to support acquisitions, the interlibrary loan function, and completion of the serials control and management reports modules.

The Library contracted with their applications software contractor for development of an interface program to download OCLC records into the Master Bibliographic File and a control program to provide for the operation of a hand-held bar code scanner. The scanner will be used for checking-out items when the system is down. It is necessary to be able to support the circulation function during periods of system unavailability, since a current system limitation is that certain functions cannot be performed simultaneously. The scanner is very porta-

ble so it also will be useful for recording internal circulation of materials and for taking inventory.

Two features of the circulation module are particularly useful in this large, highly-used library. Items which are on carts and need to be shelved may be located by library staff for patron use; each cart has a special bar code label which is recorded in the circulation record as the temporary location of the book or serial issue. Also, the system provides statistics on check-out and internal circulation of each copy of each title in the system; this information may be used in determining if extra copies of a title should be purchased or if the title should be considered for weeding.

Inforonics

This library automation system currently consists of an online catalog and a portion of both the acquisitions module and the serials control module. The online catalog will support the MARC format for books. An OCLC tape of a library's holdings may be used as input to the system. Both Boolean and subject search capabilities are currently available in the online catalog module. The acquisitions module currently consists of an on-order file; order production and acquisitions management functions are scheduled for completion by Spring, 1983. The serials control module consists of on-order information, routing, and a union listing capability; control of serials acquisition is scheduled for 1984. The serials control module currently is not linked to the other modules. A circulation module is planned for operation by June, 1983. The system operates on the Digital Equipment Corporation's DEC-system 10 or 20 computers. Inforonics is mainly a library service organization which maintains catalogs for over fifty libraries. The company is now marketing its systems.

Ringgold Management Systems

Ringgold offers the Nonesuch Acquisitions and Circulation Systems. The acquisitions module supports funds accounting and order and in-process

control for monographs and serials. Call numbers may be entered into the acquisitions module after an item is cataloged; the system can generate accessions lists in either author/title order or basic call number order. Online interface to OCLC allows full MARC format records to be added to the circulation module; partial MARC records are entered into the acquisitions module. Interfaces with RLIN and WLN also are available. Special management reports may be generated on demand. Future system enhancements will include a serials control system, full integration of circulation with the acquisitions module, and an online catalog.

The Nonesuch systems operate on the Wang Laboratories LVP, MVP, or VS minicomputers. The Wayne State (Mich.) University Library System is a new user of the acquisitions system. Circulation system users are the Yakima Valley (Wash.) Regional Library System and the Leavenworth (Kan.) Public Library System. Lawrence-Livermore Radiation Laboratory Library (Calif.) purchased the circulation software.

Sigma Data

The integrated library system, DATALIB, currently supports acquisitions and funds accounting, cataloging, an online catalog, and circulation. An online interface with OCLC has been approved and is scheduled to become operational by Fall, 1982; currently all bibliographic data must be keyed into the system. Features of the acquisitions module include control of orders for serials and production of customized purchase orders. The funds accounting feature is being enhanced. Tagged records support online cataloging requirements, and up to 25 custom-tailored record formats can be produced. An authority file function is part of the cataloging module. Online retrieval includes the capability to search by keyword, call number, and subject; full boolean logic is supported. The circulation module provides copyright control for interlibrary loan. A number of reports are produced by the various system modules.

DATALIB operates on all of Data General Corporation's Eclipse series minicomputers. The system is marketed both as a turnkey system and as a time-shared system on central computers at Sigma Data's service center.

The libraries at the Executive Office of the President and Texaco, Inc. are using all components of the integrated turnkey system. Another turnkey system user will be the library at the Department of Justice. Federal libraries using the acquisitions module on Sigma Data's computers include Housing and Urban Development, the Federal Trade Commission, and the Department of Labor. This time-shared use of the system and the development of a data base for shared input of bibliographic data for acquisitions is supported by an FLC contract with Sigma Data.

### 7.1.7 The Future with Vendor Supplied Systems

The advances that have been made in the area of functionally integrated systems are significant and, today, several system vendors are well on the way to online public access catalog modules, as well as fully integrated systems. It is doubtful, given the extremely high costs of software development, that ZOCs could fully produce complex systems for less than the purchase price of commercially available systems with similar capability, although the decision or the extent of customization to local practices and procedures is one that can only be made locally (by a ZOC). Before a decision is made as to which system to implement, careful consideration should be given to the following:

- requirements of members of the ZOC
- capability of available systems
- cost of available systems
- extent to which available systems fulfill requirements
- cost to tailor system to requirements.

More details relating to these considerations are presented in Section 10.

## AUTOMATED LIBRARY SYSTEMS

| Source: | Acquisitions | Serials Controls | Online Catalog | Online Interface with OCLC | Circulation |
|---|---|---|---|---|---|
| Bibliographic Utilities and Their Associated Systems | | | | | |
| OCLC | Yes | Ordering and check-in; claiming '82? | Somewhat | Not Applicable | -- |
| OCLC/ CLAREMONT | Yes | Ordering and check-in | Yes | Yes | Yes |
| UTLAS/LCMS | Summer 1982 | 1983 | Yes | -- | Yes |
| WLN/BLIS | Yes | Ordering | Yes | (Tape Only) | 1983 |
| Vendor-Supplied Systems | | | | | |
| ADVANCED DATA MGT | Late '82 | Fall '82 | Yes | -- | Yes |
| CARLYLE | Not Applicable | Not Applicable | Yes | (Tape only) | Yes |
| CLASS | Not Applicable | Ordering, Check-in, Claiming, Routing | Not Applicable | Not Applicable | Not Applicable |
| CINCINNATI ELECTRONICS | Late '82 | Summer '83 | Early '83 | Yes | Yes |
| CLSI | Summer '82 | 1983 | Yes | Yes | Yes |
| DATAPHASE | Fall '82 | Ordering: Fall '82 | Yes | Yes | Yes |
| GAYLORD | Summer '82 | Summer '82 | -- | Yes | Yes |
| GEAC | Yes; to be reworked - late '82 | Check-in | Yes | (Tape Only) | Summer '83 |
| ILS | 198? | Check-in | Yes | Yes | Yes |
| INFORONICS | On-order file; '83 | Some; acq.: '84 | Yes | (Tape Only) | Summer '83 |
| RINGGOLD | Yes | Ordering | 198? | Yes | Yes |
| SIGMA DATA | Yes | Ordering | Yes | Fall '82 | Yes |

## 7.2 Description of Feasible Approaches

As mentioned earlier, our actual selection of feasible approaches was based on an iterative process using data and information derived from a number of different sources. Furthermore, our approach throughout the project has been to consider flexible alternatives and appropriate levels of technology for statewide networking activities in North Carolina. We have no intentions of attempting to destroy or erode existing cooperative efforts, nor to impose a rigid, formal network structure on libraries within the state, nor to insist that networking activities be supported by computing and telecommunications facilities. We believe that such approaches would not lead to successful network implementation in environments comprising mostly small libraries. Our approach then has been to consider networking activities from the perspective of individual libraries, and then, to take a state-level view of the resulting activities.

Our selection of alternatives followed the functional dimension described in Section 5 of this report. The functions we defined as potential functions for networking in North Carolina were:

a) Library Operational Functions
   - Cataloging
   - Acquisitions
   - Interlibrary loan request placement
   - Circulation record-keeping
   - Staff training
   - Referral to experts

b) User Related Functions
   - Catalog searching
   - Reference
   - Referral
   - Document (or other item) delivery
   - User training

c) Derived Functions

Collection development

Online bibliographic searching

Electronic mail

In reviewing the above functions and their interdependencies, and given that effective physical access is dependent on effective logical access, we can discuss the functional alternatives in terms of three groups:

- those relating to logical access
- those relating to physical access
- other functions

### 7.2.1 Logical Access Functions

The building of a bibliographic database of statewide holdings is considered essential to successful networking (resource sharing) across the state. This does not mean that it is the only activity required for successful networking, but it is probably the largest single component. Like Rome, a state bibliographic database is not built in a day. It is a long term project, and once begun, must continue on an ongoing basis because out-of-date or incomplete bibliographic information is, in some respects, more frustrating than none at all.

The networking functions that relate to the development of a logical access database are cataloging (with holdingsinformation) and circulation record-keeping. These, between them, generate information about the holdings of libraries and their availability within the library. Once this information is available a number of additional functions can be derived or facilitated: acquisitions, interlibrary loan request placement and collection development. The acquisitions function can be served by the logical access database in the pre-order bibliographic description of an item. The ILL request placement is assisted by identification of all libraries within the state holding the required items at the time of request. Collection development decisions can be facilitated by accurate knowledge of the distribution of holdings within the state.

One final topic to be discussed before defining alternatives is mode of access to the network. This is a particular concern for small libraries. One of the most frequently-heard comments on the feasibility of state wide networking was "We can't afford the equipment". Markuson, et al. [13] described four basic modes of access to OCLC particularly well-suited to small libraries:

- centralized service
- processing centers
- shared terminal access
- dial-up terminal access

Centralized cataloging services

This access method involved cataloging without the item in hand, thereby eliminating the cost of shipping and handling an item. In such an operation, many libraries can be serviced from a single card production profile, thereby accruing the major benefits of reuse of OCLC records. Such a service can be set up rapidly, within about six months, and requires a minimum of capital outlay because the equipment is fully utilized. It is possible, with experienced staff, to catalog on the order of 25,000 titles per terminal per year. A further advantage of full centralization is minimization of training and management resources.

Processing centers

Several statewide and school system processing centers already operate in North Carolina, some using OCLC services via SOLINET. Establishing a processing center requires more capital outlay than a cataloging service since more space and equipment is required to handle the physical aspects of processing. While processing centers offer the packaged service that relieves the small library of most of its technical processing burden, costs are considerably higher than for cataloging alone.

A full book processing center can provide many advantages of the OCLC systems: the database is available to answer questions related to acquisition; the catalog cards can be produced automatically, as can the spine and book pocket labels.

Sharing Terminals

Many OCLC users do not have sufficient cataloging volume to utilize a terminal to its maximum. Terminal sharing is a potential solution to partial utilization of resources. However, this approach seems practical only for libraries large enough to be able to 1) bear their share of the system costs, 2) spend the time learning to operate the system, and 3) have staff away from the library to process on the shared terminal without impeding local

service. Further, for very low volume users, infrequent use of the system may tend toward less efficient use. Sharing is probably best suited to libraries processing at least 1,500 to 2,500 titles per year.

Libraries undertaking to share terminals have to plan equitable managements for access, payment, priorities, etc. Another feasible approach is for networks to own terminals, located centrally or distributed throughout the area, which could be made available for a standard fee structure for small libraries.

Dial-up terminal access

OCLC allows access to its system through both dedicated and dial-up terminals (and plans to expand its dial-up capacities through the use of protocal converters, see p. 94). Dial-up allows libraries to use less expensive terminal equipment and, in some cases, terminals that are already available within an institution. This approach, due to the higher telecommunications costs per unit of time, is cost effective only for libraries with a small cataloging load. However, once in place, the terminal can be used to access other systems and services.

These four access modes apply to most of the functions to expand the number of potential alternatives.

Cataloging alternatives

Given the substantial investment in OCLC (via SOLINET) by libraries in North Carolina, the continued, and increasing, use of OCLC is one alternative for cataloging of all types of materials. The mode of interaction within OCLC, however, increases the number of possible alternatives for using OCLC. They are:

- using OCLC via SOLINET
- using OCLC via SOLINET and a LAMBDA-type system
- using OCLC as a state network
- using OCLC as a state network via a LAMBDA-type system.

For each of the above, the following access modes are possible:

- centralized cataloging service
- processing centers
- shared dedicated terminals
- shared dial-up terminals
- individual library dedicated terminals
- individual library dial-up terminals

The final option for cataloging is not to use OCLC (or any other shared cataloging service):

- Manual cataloging
  - centralized cataloging service
  - processing centers
  - individual libraries.

Acquisitions alternatives

A number of acquisitions alternatives exist, and the exact choice will, to a large extent, be determined by the choice of cataloging options. The alternatives for monograph and serials acquisitions include:

- use of OCLC acquisitions subsystem
- use of an integrated library automation system acquisitions module when available
- use of stand-alone microcomputer-based system, e.g., Gaylord, Ringgold, etc.
- use of broker-specific systems, e.g., Baker and Taylor, Brodart, Ebsco, Faxon, etc.
- manual system.

As before, for each of these the following access modes are possible:

- processing centers
- shared dedicated terminals for specific systems (OCLC, Brodart, Faxon, etc.)
- shared dial-up terminals
- individual library dedicated terminals
- individual library dial-up terminals.

Interlibrary loan request placement

The process of placing ILL requests is dependent on the identification of libraries holding the required item. Once a bibliographic database of statewide holdings has been established, with appropriate holdings information, then requests for loan can be placed. The selection of alternatives for ILL request placement will relate closely to the choice of options for building the cataloging database. Options for ILL of monographs include:

- use of the OCLC ILL subsystem
- use of integrated library automation system ILL module when available
- use of state library reference service.

The mode of access by libraries will be selected from:

- processing centers
- shared dedicated terminals
- shared dial-up terminals
- individual library dedicated terminals
- individual dial-up terminals
- in-state WATS lines.

Additional tools for identification of materials prior to loan request placement include union lists of serials and directories of special collections, resource people, etc. Alternatives for union lists of serials include:

- use of OCLC serials subsystem
- use of integrated library automation system serials subsystem when available
- use of CLASS serials union list software
- use of specially developed software for centralized mini- or microcomputer housed at State Library reference service.

The mode of access by libraries will be selected from:

- processing centers
- shared dedicated terminals
- shared dial-up terminals
- individual library dedicated terminals
- individual library dial-up terminals
- in-state WATS lines.

We anticipate that additional statewide directories, of special collections or resource people could be stored and maintained in machine-readable form at one central location, such as the state library reference service and accessed by libraries via the WATS lines or else by dial-up terminals.

Circulation record-keeping

Circulation record-keeping is an activity best performed at a local level. However, there is some merit, not the least being the distribution of set-up and operational costs, of libraries sharing circulation control facilities. This concept was the motive behind the Public Library Networking Plan (see p. 37). Circulation record-keeping generates information about current availability of

holdings in a library and thus completes our logical access database. The alternatives for circulation control are:

- an integrated library automation system circulation control module serving several libraries in a locality
- an integrated library automation system circulation control module serving an individual library
- a dedicated circulation control system serving several libraries in a locality
- a dedicated circulation control system serving an individual library
- manual.

Access options to these types of systems include:

- individual library dedicated terminal
- individual library dial-up terminal
- manual

7.2.2 Physical Access Functions

Once a desired item has been located and its current availability status determined, the physical access mechanism comes into play. One of the primary motivations for statewide library networking in North Carolina, as expressed in the RFP, is:

> "Develop a statewide interlibrary loan network encompassing all print and non-print materials and utilizing computer and telecommunications technology as appropriate."

The strength of an interlibrary loan service lies in efficient and effective logical and physical access. Both are essential components. Efficient and

effective logical access without good physical access as backup leads to frustration on the part of patrons. Efficient and effective physical access without corresponding logical access is only good for those items that are located and currently available. Again, considerable frustration can occur if after a lengthy search, an item is not available within a reasonable time limit.

Earlier in this section we stated that the key to successful library networking in North Carolina is the continued building of a statewide bibliographic database for logical access. This does not mean that physical access should be ignored. Physical access represents the other side of the coin and is a necessary component in the networking activity. The technology of physical delivery of documents is changing rapidly (see Section 2) but it is unlikely that we will see electronic delivery of items for some years to come. The most likely alternatives for delivery are:

- unified courier/van delivery service serving the entire state on a regional basis

- U.S. mail service.

SECTION 8

ECONOMIC ANALYSIS OF ALTERNATIVES

## 8.1 Introduction

As a result of our goal of preserving flexibility of networking activities, our economic analysis was broken down by function. We further wished to support management decision-making in individual libraries or library systems, as well as from an overall state viewpoint. To this end, we developed a series of cost models describing discrete activities within functions. For example:

Function: Cataloging

Activities: Pre-Catalog Searching
Original Cataloging
OCLC Record Update
Card Filing
Physical Processing

These activities can also be applied to the types of materials being handled:

- Monographs
- Serials
- Audiovisuals
- State Documents
- Other Materials.

Three types of costs are involved in the cost model:

(1) Fixed one-time costs such as purchase of equipment, initial training, network initiation fees, etc.

(2) Fixed costs which recur on a regular basis such as equipment rental, line charges, annual training, etc.

(3) Variables costs associated with volume of activity such as total items cataloged, total items ordered, etc. Cost elements associated with variable costs include labor, equipment, supplies and communications.

The detailed cost analyses of alternatives can be found in Appendix 1. Here we discuss the application of the models for a hypothetical library.

The first function to consider is cataloging. This was considered the key function that would support the creation of a statewide bibliographic data base (considered the top priority at the Panel Session in April; see page 74). The total costs of cataloging all materials by various alternatives are summarized on pages 196-197. Let us assume that our example library catalogs a total of 25,000 items per year. We need to estimate the mix of materials that are cataloged, i.e., serials, audiovisuals, state documents and other materials as well as monographs. Based on 1981 public library statistics [16], we assume that the number of serials will be about 6 percent of the number of monographs, audiovisual materials 143 percent of the number of monographs, and state documents and other materials will be 25 percent of the number of monographs. Thus, 36 percent of the total materials cataloged will be monographs, 2 percent serials, 52 percent audiovisual materials, and 10 percent state and other materials. Using this assumption, we can then tie all costs again to the number of monographs as follows:

| | |
|---|---|
| • Total Items Cataloged | 25,000 |
| - Monographs | 9,000 |
| - Serials | 500 |
| - Audiovisuals | 13,000 |
| - State Documents and Other Materials | 2,500 |

We apply these volumes to the cost models together with the following assumed hit rates on the OCLC data base to calculate total costs.

- Monographs 90%
- Serials 10%
- Audiovisuals 50%
- State Documents and Other Materials 14%

The total costs of cataloging alternatives for the hypothetical library in one year (amortizing fixed one-time costs over three years) are:

- Manual Cataloging $397,060
- In-House OCLC Terminal 345,084
- In-House Dial-Up Terminal 484,576
- Shared OCLC Terminal 389,620
- Shared Dial-Up Terminal 515,096
- Centralized Service 359,442

Based on this analysis, our hypothetical library should acquire an in-house OCLC terminal for cataloging purposes.

The next step is to consider the other functions that could be supported by the OCLC terminal once it is installed. The candidate functions are:

- Interlibrary loan requesting
- Acquisitions
- Serials control.

We foresee that ZOCs will eventually support their circulation activities and a public access online catalog on an ILAS. Such systems also support:

- Interlibrary loan request preparation
- Acquisitions
- Serials control.

Reviewing the costs of interlibrary loan request placement on page 201, it is clear that where possible the OCLC system should be used (i.e., if there is time available on the terminal).

The remaining decisions relate to support of acquisitions and serials control via OCLC or the ILAS. The following possible situations can arise:

| | OCLC Terminal | ILAS | Decision |
|---|---|---|---|
| Time Available | Yes | No | OCLC |
| | No | Yes | ILAS |
| | Yes | Yes | ? |

In the situation where either the OCLC terminal or the ILAS can be used, the appropriate action can be determined by the comparison of the variable cost elements only, as the fixed costs have been allocated to the primary functions (cataloging for OCLC and circulation control and online catalog searching for the ILAS).

## SECTION 9

## RECOMMENDATIONS

1. Networking activities should be directed towards, but not limited to, the continued building of a machine-readable bibliographic data base of statewide holdings.

2. The bibliographic data base should be developed through the OCLC network either directly or indirectly.

3. We recommend the continued use of SOLINET for the services it brokers for OCLC. SOLINET activities and Board decisions should be carefully monitored. If the situation should arise that SOLINET is unable to provide its traditional services, libraries in North Carolina should create their own network organization to act as intermediary between individual and groups of libraries and OCLC.

4. The primary OCLC services to be used should be cataloging and interlibrary loan request placement.

   a. Those libraries currently using the service, or in the process of acquiring terminals, should continue to do so in the same way they are now doing. That is, on an individual basis, or through processing centers, or as consortia.

   b. Libraries not currently using OCLC should determine their mode of interaction according to the breakeven points derived from the cost analyses. For example:

      - If total annual monograph cataloging volume is greater than 10,300 purchase a dedicated OCLC terminal for in-house use.*

      - If total annual monograph cataloging volume is less than 10,300, then either use a centralized state cataloging service or share a dedicated OCLC terminal with other libraries (thereby forming a ZOC).*

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*Assuming a 90 percent hit rate.

5. In addition to the cataloging of monographs, the OCLC system should be used to catalog serials and audiovisual materials. Union lists of serials should be produced using OCLC.

6. Directories of other statewide library resources (special collections, directories of expertise, etc.) should be produced centrally and updated on an annual basis. Data collection should be done using questionnaires (sent by mail).

7. Circulation recordkeeping is a function that should be organized at the local level. We recommend that the circulation control module of an integrated library automation system be used. Each library or group of libraries (ZOC) should have its own ILAS which, eventually, will support an online public access catalog for members of the ZOC.

8. Acquisitions should be handled at the local level wherever possible (through the establishment of ZOCs). The acquisitions module of an integrated library automation system should be used to facilitate clerical procedures.

9. The placement of requests for interlibrary loan should be sequenced as follows:

   a. A library should search its own ZOC online catalog.

   b. If no such catalog exists, or if the item is not located, use OCLC ILL subsystem.

10. A regionally organized statewide courier service should be set up, with points of contact which enable materials to pass across regional boundaries. The regional service could cover a single ZOC or several.

11. We recommend that an individual within the Division of State Library be designated as the contact person to act as liaison between SOLINET, OCLC and other facilities, and libraries within the state.

12. We recommend that a pre-implementation period be devoted to promotion of networking activities in the state. This should be directed at all types of libraries or their staff and should reassure both librarians and patrons about the effects of networking on their library environment and gather their feedback and suggestions.

13. The Consultant for Multitype Library Cooperation or Assistant should be designated responsibility for providing advice to librarians throughout the state on the application of the cost models derived in this report, and on the interpretation of ensuing results.

14. The last recommendation concerns a pilot project with a small group of libraries. We suggest that approximately eight libraries form a ZOC, design and implement the most appropriate system, and produce a set of guidelines for setting up ZOCs.

SECTION 10

IMPLEMENTATION PLANS

## 10.1 Introduction

The implementation of the recommendations outlined in Section 9 is a long-term process. In this section we consider implementation activities over the next five years. Although several of the activities are sequence dependent, many can be conducted in parallel, in keeping with our original intent of enabling libraries to progress with networking activities at their own pace. We divided the implementation activities into three groups (each over the five-year period) as follows:

- Activities to be conducted by the Division of State Library, or representative group within it
- Activities to be conducted by individual libraries
- Activities to be conducted by ZOCs.

The types of implementation activity are similar for each group although the specific details may vary. The types of activity are found in the system life cycle as follows:

- Planning and Analysis
  - Set up planning committees
  - Perform cost and other analyses
- Detailed Design
  - Produce detailed system specifications
  - Determine resource requirements
  - Design operational procedures

- Preparation for Implementation

  - Obtain resource commitment
  - Procure equipment
  - Train users

- Installation

  - Test
  - Operate

- Evaluation and Further Planning

  - Data collection and analysis

## 10.2 Implementation Activities for the Division of State Library

### 10.2.1 Promotion and Feedback

One of the most baffling of problems which planners face is resistance to change. Such resistance may manifest itself in a variety of ways, e.g., refusal to use technology, self-imposed decrease in productivity when using the technology, and lack of cooperation in implementing or using the technology. In the public library environment, resistance may potentially arise in two areas: among the librarians and among the library users. On the whole, the underlying reasons are similar - uncertainty, fear of loss of control, and fear of unemployment as a result of the growing implementation of new technology (by the librarian in the library, and by the library user in his/her place of employment). Consequently, the steps that can be taken in an attempt to minimize resistance will be the same in either case.

One of the main concerns for implementation at this level is how to ensure the ongoing, active cooperation of librarians in networking activities.

Many networking projects, and many automation projects, have failed as a result of noncooperation based primarily on lack of understanding of the potential nature of the new system, product or service in a local situation.

Overcoming resistance is a major problem in implementing changes in any organization. Unless resistance is dealt with adequately, the changes might be met with aggression, hostility, restricted production and a lack of cooperation from those affected by the changes. Several authors [18-20] have attempted to address this issue by defining what kinds of measures can be used to overcome resistance to change (these mostly have been applied to industrial environments). Some of the methods suggested include: employee (and user) participation in developing and implementing the changes, understanding the social aspects of the changes, developing a cooperative atmosphere between library management and those affected by the changes (i.e., the librarians and the users), fostering communication of what the changes are and the rationale behind them, and creating a general organizational attitude which will foster greater cooperation in the change process.

To a large extent the participatory approach to the development of change has been initiated through this feasibility study. The hearings and presentations were all aimed to maximize interaction among librarians in the state. Such an open approach is strongly encouraged for future implementation activities.

Another way of dealing with resistance to change is by understanding the social, and not just the technological, aspects of the changes. The social aspect of change involves the way those affected by change think it will alter their established relationships in the library organization. If a change threatens the usual pattern or style of their social relationships, then the change will be met with resistance. For example, if librarians are used to certain relationships with their supervisors through which they have some input into the proposed changes and then are forced to change work style without explanation, they will feel threatened as to their role in the social milieu of the organization. Understanding these social aspects of change is equally

as important as the technological changes and must be considered and dealt with before any change can be successfully implemented.

A third way of reducing resistance to change is by developing a cooperative atmosphere between those who are implementing the changes and those who are affected by them. The technical people involved in developing the changes must consider the changes from the operators' and users' points of view and be willing to work with them in making the changes. Library management must not ignore the "know-how" of their employees, or the pride of the employees in their work, but instead utilize their capabilities in helping the changes succeed. The technical people must be willing to explain the changes in easy-to-understand terms so that the employees can really understand what the changes involve.

Another important cause of resistance to change is misinterpretation by the librarians and users as to why the changes are taking place and their effect on the library environment. Management must foster good communication about the changes by encouraging discussions and information sessions as to the exact content and effects of the changes. It is important that this communication precede the actual implementation to allow people to digest and prepare for changes rather than be surprised by and possibly resistant to them.

We recommend that the first implementation activity be focused on the dissemination of information relating to the feasibility of library networking and the collection of feedback from librarians throughout the state. This can be done through seminars, workshops, newsletters, hearings, etc. Other, less common, dissemination media (that have been used successfully by King Research for dissemination of research results) include television and radio.

We anticipate a fairly intensive effort of this type being conducted over a six-month period following distribution of the study report. We envisage that all members of the Working Committee could be involved.

10.2.2 Advice on Application of the Cost Models

The cost models described in Section 8 and Appendix 1 were designed to be used by individual libraries and groups of libraries to assist in the determination of the optimum networking configuration for that library (or group of libraries). The models are described in such a way that libraries can input volume estimates and other pertinent data relating to their own operations, procedures and resources so that more accurate cost comparisons can be achieved.

Many librarians will be unfamiliar with the use of cost models and interpretation of results. We suggest that the Consultant for Multitype Library Cooperation, or an Assistant, take the responsibility for providing advice and support to librarians as necessary. The "advisor" should have a strong background in quantitative methods and should make librarians comfortable about working with numbers. Advice should be available on an ongoing basis as the models themselves can be used on an ongoing basis, possibly being expanded and/or refined as librarians begin to collect more accurate cost data.

The cost models themselves provide the framework for ongoing evaluation by defining the data that are required for analysis. The evaluation of networking activities in the state can and should be based on the cost models also. More detail concerning such evaluation is included in Section 10.2.6.

10.2.3 Determination of Processing Center Requirements

Once librarians start applying the cost models to their own local environments, the requirements for a centralized processing center should be addressed. Rather than setting up a processing center from scratch, we recommend that the State Library Processing Center be modified to support those libraries for whom a centralized approach is economically appropriate. The modifications would include the installation of terminals for access to OCLC via SOLINET. As current delivery times for such terminals is so slow, we recommend that orders be placed as soon as possible. The major consideration is how many terminals to order. An initial order capable of supporting the current load of the

Processing Center contracts could be placed within the next few months. (We estimated that one terminal could support cataloging of up to 22,000 items per year.)

In addition to ordering and installing terminals, Processing Center personnel will need to be trained in the use of the OCLC system. This training will need to be scheduled prior to installation of terminals so that operation can begin as soon as possible after delivery.

Other preparation for automation of the Processing Center involves the review and possible modification of procedures. A manual outlining the procedures to be followed by both librarians using the Processing Center and personnel within the Center should be produced. Such a manual need not be complex but should serve as a basic guide for new users of the Center. The resource of personnel trained in the use of OCLC within the Division of State Library (or, in fact, throughout the state) should be further exploited by the setting up of an in-state training course, operated by the State Library for librarians in the state.

We anticipate that all activities above be initiated within six months, although delivery of terminals may delay full implementation for up to a year.

### 10.2.4 Set Up Pilot Zone of Convenience

Having set in motion procedures for automating the State Library Processing Center, attention should be turned to ZOCs. We recommend the establishment of a pilot ZOC (outside of the Triangle area) comprising at least a public library, an academic library, a special library and a school library. A mixed group of libraries willing to experiment and cooperate should be selected for the pilot project.

The first step after selection is a detailed design study for the ZOC. This study will need to determine:

- processing requirements of each of the members of the ZOC
- exact configuration of the ZOC in terms of operating resource requirements (equipment, personnel, financing, etc.)

- integrated library automation system (ILAS) requirements (which would form the system specification for incorporation into a Request for Proposals) and selection of host site for the system

- mode of interaction of members of the ZOC both with the logical access data base and for physical access

- design of a set of procedures for ZOC members resulting in a Procedures Manual

- cost recovery mechanisms for implementation and operation of the ZOC and its ILAS.

The products of the study should include:

(i) a detailed design document, including a system specification for an RFP, for the pilot ZOC

(ii) a "Do-It-Yourself Guide to Setting Up a ZOC" which can be used by other candidate ZOCs.

We envisage the detailed design study taking approximately six months from selection of a candidate group of libraries.

The next step is to implement the detailed design. Two stages of the ZOC operation need to be considered. The first is to implement the use of OCLC via SOLINET by all members of the ZOC under the most appropriate conditions for ZOC members. Some ZOC members may be using OCLC already (e.g., the academic library); others may not be. The choice of alternative (in-house OCLC terminal, shared OCLC terminal or centralized processing center) will be based on the results of cost analyses performed during the design phase and on other noneconomic considerations (e g., level of control desired). In the case of a shared terminal, the location and scheduling of access need to be determined. ZOC members

should use OCLC primarily for cataloging (of all materials) and also for inter-library loan (using the ILL subsystem). Once again, the importance of early ordering of OCLC terminals is emphasized.

The second stage of the implementation of the ZOC is to acquire and install an ILAS at the selected host site.

Implementation of any automated library system involves the following four steps:

- Preparation of the Request for Proposals (RFP)
- Vendor selection
- Preparation for automation
- Service-by-service implementation.

In what follows, we shall give our recommendations for how to perform each step and what to expect along the way.

PREPARATION OF THE RFP

The established government procedures for preparing and releasing an RFP will guarantee a relatively fair, open and responsible selection of a library system vendor. These procedures will determine the basic format of the request, the legal and administrative rules governing all parties, and the basic methods of contract award.

Preparation of the RFP will involve the following steps:

1. Achieving consensus within the ZOC

   The member libraries and their respective administration departments must first agree that:

- library automation is desirable
- a minicomputer turnkey system should be procured
- an appropriate budget should be selected.

The justification for these premises and the facts and figures to support them will be contained in the design document.

2. Preparation of the RFP

The contracts administration departments of the member libraries can assist in writing the legal and contractual sections of the RFP. The libraries will be responsible for writing the technical sections. Our recommended guidelines for that section are included below.

The goals of a request for proposals are:

- To acquire a system which meets library requirements
- To acquire a system with the least total cost and highest cost effectiveness
- To protect the libraries against failure by the vendor to meet his commitments
- To provide an objective basis for selecting the best proposal meeting the first three goals.

The first goal, meeting library requirements, can be met by clearly specifying a list of library requirements. Each vendor should address each requirement. He should either meet it directly, provide some equivalent capability, or show that in his system such a requirement is really not of great value to the library.

The second goal, least total cost, can be met by requiring the vendors to submit complete cost information and reveal any otherwise hidden costs of acquiring or operating the system.

The third goal, protecting the library, can largely be achieved with standard government contractual requirements. Particular emphasis should be placed on maintenance services, response times and software delivery schedules. However, the libraries should not write conditions which are so onerous that they discourage vendors from bidding or force them to greatly increase the price. More will be said on this later.

The fourth goal, providing an objective basis for selection, can be met by encouraging short, precise, factual proposals from vendors in some standard, easy-to-compare format.

Elements of the RFP

In addition to the standard language specifying all terms and conditions of dealing with the government, we suggest that the following elements be included in the RFP:

1. Overall Scope of the Project

   Overall requirements should be stated, i.e., an integrated turnkey minicomputer system for online catalog service, circulation control and interlibrary loan, using a full MARC format data base. Desirable features include acquisitions, serials control and management information.

2. Description of the Library

   The system includes four libraries, each with a specified number of books, journals, patrons and circulations. Union catalog contains _____ titles for each category, _____ are now in machine-readable form, etc.

3. Format of the Proposal

Vendors should present their proposals in a common format to allow objective evaluation.

It is very important that the format be clear and precise - easy for the vendor to produce and easy for the library to read. The format must not be so complex that vendors are discouraged from bidding. If the vendor must spend $5,000 or more just to write the proposal, many simply will not bid.

We suggest that the format make extensive use of lists and checklists, e.g., for functional requirements, each requirement can be listed with the vendor instructed to check different columns for:

- feature is ready now and can be demonstrated
- vendor will commit to development
- substitute feature is proposed (describe)
- feature is not available
- vendor comments.

4. Functional Requirements

Requirements applicable to all services should be grouped together followed by the specific requirements for each particular library service.

The overall functional requirements might include such things as:

- capacity
- performance
- maintainability
- documentation
- training.

Specific requirements might be organized by library service, e.g.,

Circulation:

- use light pens
- process transactions in real-time.

Check-out:

- link item to patron and patron to item
- check for patron:
  - over limit
  - books overdue
- establish due date
- override defaults for patron block, due date

Check-in:

- delink patron and item
- check for item on hold, trap, snag or lost

In each case, the vendor should check:

- feature can be demonstrated now
- will commit to development
- substitute proposed
- not available
- comments.

The construction of functional requirements appears to be very difficult. However, a great many successful documents have already been written by other libraries and these can serve as models for writing the ZOC document. To a great extent, this document can be produced by selecting specifications from these other documents and organizing them into a coherent whole.

5. Evaluation and Acceptance

The proposal should state clearly the criteria for evaluation of proposals and acceptance of the system.

6. Costs

The vendors' cost proposals should list all products and services they are proposing to sell, with prices. They should also list all products or services required by the libraries which the vendor does not propose to sell. These might include:

- air-conditioning
- power and data cabling
- telephone lines
- expendable supplies - paper, labels, etc.

Products and services supplied by the vendor should be separately enumerated and priced. Lists with prices should be submitted for:

- hardware
- software
- supplies
- services
- maintenance.

For each item on each list, the quantity, source (if other than the vendor), description, model number, and price should be given. Thus, for example, in hardware a vendor might propose:

1 - Data General Eclipse C/350, 512K ERCC MOS RAM
4 way interleaved, $75,000

and then similarly list the tape drives, disk drives, communications controllers, printer, terminals, etc.

Software lists should include system and applications software.

Supplies should include disk packs, tapes, paper, labels, etc.

Services should include installation, initialization, training, and any other proposed services.

Maintenance should include both hardware and software maintenance.

While the bottom line price is the critical one, it is very important to see every item included in that price. Pricing those individually gives the libraries a picture of the role of each component in the overall system price.

Problems to Avoid

There are a number of common pitfalls in writing automation RFP's. Things to avoid are:

1. Carrying Over Manual Practices into the Automated System

Many organizations buying their first computer will list all of their manual procedures as things which must be performed by the computer. In fact, these procedures may be entirely inappropriate in an automated system. Examples are catalog filing rules, maintenance of printed lists, etc.

2. Overspecifying Details

The RFP should specify what a system has to do rather than how it should do it. Too much detail forces the vendors into a straightjacket and eliminates many good ideas from consideration.

3. Lack of Format Compatibility

If vendors' proposals do not arrive in some common format with lists and checklists, they will look like apples and oranges to the reviewers. The checklists are particularly valuable for objective comparison.

4. Onerous Terms and Conditions

If vendors are told that they will not be paid for six months after installation, or if the computer is down two days running, or under similar conditions, then some good vendors won't be able to bid and those that do will have to add considerably to their prices.

The library should set terms and conditions which protect itself, but which also provide prompt rewards for a good installation and offer fair opportunities for the vendor to work out problems.

## VENDOR SELECTION

Selecting the vendor is the most critical part of the entire implementation process. The system installed should be a good one and the vendor's support should be strong. The libraries will be heavily dependent upon the vendor for service, support and enhancements for up to ten years after the contract award.

Steps in the selection process should include:

1. Prepare Checklists

Vendor proposals are typically very different from each other in both organization and substance. Checklists should be used to normalize comparisons.

2. Evaluate Technical Proposals

Proposals should be evaluated for their ability to meet technical requirements. A technical ranking should be made.

3. Evaluate Cost Proposals

Those proposals meeting basic technical requirements should then be evaluated as to cost. In our opinion, libraries should not automatically select the lowest bidder meeting minimum technical requirements. Long-term cost benefits are far more important than what are likely to be relatively small differences in initial cost.

4. Negotiate with leading vendor(s).

On any complex contract such as that for a library computer system, there are likely to be some areas where even the best vendor proposal does not meet library expectations. If that is the case, then the library may wish to critique one or more proposals and ask for a best and final proposal.

5. Award a contract.

PREPARATION FOR AUTOMATION

The libraries must actively work to prepare for automation. The libraries should not expect that the vendor will take the whole problem off their hands. On the contrary, a major part of the organization and effort will have to come from library staff.

Preparatory steps include:

1. Appoint a "Systems Admininistrator"

One person should be appointed to take overall responsibility for successful implementation of the system. This need not be a new hire and in fact there is some advantage in appointing a person who is familiar with the library's staff and current operations.

The system administrator should take full responsibility for successful implementation of the system. This will be a part-time job up until computer installation. It will then become full-time for several months, and then go back to part-time again.

As stated earlier, a good person who takes personal responsibility for the project will make a big difference in the project's success. An additional one or two people should also be identified to back up the system administrator.

2. Prepare Site

The host library will have to make available space for the computer with suitable air-conditioning and power supply. Data cables will have to be pulled from the computer to the terminal stations in the library. Shielding and/or short haul modems may be required. Sufficient power outlets will be required at each station for a CRT terminal and possibly for screen printers or bar code readers. Data cables and power outlets will also be required in the branches.

The vendor can and should provide specifications for space, power, air-conditioning and cabling. Site preparation should be completed early, preferably at least one month before the computer is due. Last-minute frantic efforts are to be avoided.

3. Procure Data

The libraries will have their back file of OCLC cataloging data available on magnetic tape from SOLINET.

4. Procure Supplies

If system supplies - tapes, printer paper, bar code labels - are not procured from the system vendor, they should be ordered in advance.

5. Orient Staff

A basic orientation should be given to all staff explaining such topics as:

- What is a computer?
- Why are the member libraries acquiring one?
- How will the staff be affected?

6. Install Hardware and Software

It is rare for all equipment to arrive and be installed on the same day. The library should expect installation to last several days or longer with small items coming in as much as several weeks early or late. This is normal and should not cause any disruption in library activities.

Software installation usually involves loading one or more reels of tape and initializing up to a hundred or more parameters. The system administrator will have to work very closely with the vendor's staff to set up and initialize the system. Again, a few errors are normal before everything gets straightened out.

7. Accept the System

In today's financial climate, vendors typically pay two percent per month in interest for money borrowed to buy equipment. They need prompt payment, or they must bill back their losses to their customers.

We recommend that a comprehensive straightforward test should be promptly conducted to ensure that the system works. A one- to two-week acceptance test will probably reveal all or almost all problems that would have occurred in a 60- or 90-day test and will save thousands of dollars for one or both parties. This test can be designed as part of the detailed design project for use in the pilot test but also for future ZOCs.

SERVICE-BY-SERVICE IMPLEMENTATION

Implementation priorities were addressed earlier in this report. The two high priority functions for the ILAS - online catalog services and circulation control - should be implemented within the first year. The remaining ILAS functions - acquisitions, serials control and management information - should be implemented only after the first two and only if and when they are developed and available. The vendor with the best catalog and circulation modules may or may not have good subsystems for the other functions. Since the high priority functions should determine which system is selected, the second level priority functions may or may not be immediately implemented as part of the minicomputer system.

We shall discuss the implementation of each function separately and then show the relationship of all together in our schedule. Again, we note here that the actual implementation will be dependent upon the specific system and vendor selected.

Online Catalog Service

The steps in automating catalog service are:

1. Analyze Catalog Requirements

The system requires that decisions be made about what fields will be stored in the catalog, which ones will be indexed, what index construction algorithms will be used, what priorities will be assigned for selection of call numbers, what stopwords should be used, etc. There must also be an analysis of how to handle any local use information (e.g., 049 fields) if such exists and an analysis of what will be done with all portions of the OCLC tapes, including change and delete transactions.

How all of this is handled depends a great deal on what facilities the vendor has in his online catalog. Some may offer few options and require the library to do what the system prescribes. Better systems offer many options to the user.

If the options exist, we recommend that the library store the entire MARC record in its data base and provide extensive indexing on all fields containing useful information. Access by both full heading and key word should be provided for all authors, titles, subjects and added entries. The extra cost of storage for these indexes is small in comparison to their value.

2. Initialize the System and Test

Dozens of parameters may have to be be entered into the system as a result of the analysis. The vendor will actually input the parameters.

It is then desirable to load a sample of the data base (e.g., 1000-2000 records) and test it to see that the parameters are

right and the analysis was correct. Reference librarians and catalogers should both be involved in this test. If they discover any strange results in indexing or searching, then the parameters should be corrected for the full data base load.

3. Load the Full Data Base

The more sophisticated the system, the longer the load will take.

The most sophisticated systems examine every field of a MARC record, process them into internal formats, pass them against authority files, break them down into words and phrases, filter them through initial article and stop word lists and create indexes. This can take 30 seconds/record or, for an initial load of 70,000 records, close to one month of 24 hours per day of processing.

4. Train

Virtually the entire staff must search the catalog and hence they all must be trained. If the system is sufficiently user friendly, the staff should be able to learn simple searching in just a few minutes and pick up sophisticated searching with a few hours' work.

5. Implement for Staff Use at Host Site

The host site should be the test site for all services.

6. Test and Tune

With a couple of weeks of experimental use at the host site, it may be possible to find ways to tune the system, e.g., by altering screen displays or parameters.

A large-scale test should be organized to check performance with all available terminals on the full data base. If performance is unsatisfactory, some remedial action may be necessary (e.g., more memory, upgraded processor, different indexing, changed parameters, etc.).

7. Implement at the Member Libraries

Again, some training, testing and tuning may be required. Any bugs in the communications system will have to be found and removed. Any performance shortcomings will have to be addressed.

8. Implement Patron Access

Online catalogs have already been demonstrated in a number of libraries, and it is clear that the public likes them.

A very short, simple document should be prepared explaining the benefits of online searching, the step-by-step procedures for searching, and the coverage and limits of the online file. In a good system, the catalog itself should be self-explanatory and very little supplementary documentation will be required.

9. Implement Remote Access

Several dial-up access ports should be provided. The appropriate telephone numbers, access codes and sign-on instructions should be distributed to a select experimental group before being made generally available. The phone numbers of the reference desks in the member libraries should also be included.

In our opinion, this type of access is less useful than voice contact with a library staff member who searches the computer for the patron. The staff member can typically do in 20 seconds what a

casual user might take five or ten minutes to figure out. However, remote access may turn out to be very useful in those cases where a librarian or other information specialist or a very heavy library user is connected to the system.

10. Freeze the Card Catalog

As soon as the library is satisfied that the system works, that response time is adequate, that users are ready and that the hardware is reliable, the card catalog should be frozen. No more cards should be ordered. None should be filed. None should be edited. The library may wish to continue weeding the card catalog for withdrawn books, but even that should be regarded as a relatively low priority activity to be done only if staff time is available.

Any time maintenance is to be performed on the catalog, e.g., changing a heading, it should be done in the online file only. If some card form records are deemed important enough to maintain, then they should be converted to machine-readable form and maintained online.

In order to be successful, the machine-readable catalog must be totally secure and be backed up in the event of problems. Complete magnetic copies of the file should periodically be made and stored off-site. An occasional human-readable copy should also be made as an emergency backup for when the computer is down. Such a copy could be very cheap, e.g., main entry only, one 132 column line per record, cumulated and produced once every one to two years. If excessive down-time is occurring, the right solution is to fix the computer, not back it up with expensive paper files.

This step - freezing the card catalog - is the payoff for online catalog services. It should be implemented as soon as possible, probably within 3-6 months of going online.

11. Ongoing Conversion

It will probably not be cost effective to attempt a massive retrospective conversion of the libraries' existing card files. Too many records for old and dated materials would be converted. The cost would be very high and the benefits significantly lower than for current materials.

Future technological developments may someday reduce the conversion costs (minimum of about $0.50/record). However, in the meantime, we recommend that the libraries convert materials such as circulating books, journal titles, reference books - books which are being used frequently within the libraries.

Circulation Control

Circulation control is another high priority function in the library. Online circulation control integrated with an online catalog will provide current, accurate information about where library materials can actually be found.

Implementation of circulation control can begin before implementation of the online catalog is finished. The implementation steps are as follows:

1. Develop Conversion Procedures

In conjunction with the vendor and depending upon the specific facilities available in the chosen system, the library should work out procedures for:

- labeling books
- conversion of records for labeled books
- phasing out of the old system.

These procedures should be developed by thinking out the problems, visiting other library sites and studying their experience and walking through the chosen procedures in the libraries.

We expect that the most likely procedures will include:

- Bar code labeling all new books and creating copy-specific circulation records at the time of cataloging.

- Labeling existing books "on the fly," as they are brought to the circulation desk.

- Finding or creating bibliographic records for circulating books after the patron has already checked them out and left the library.

- Converting certain books, e.g., in very high use areas, in batches, as time permits.

2. Analyze Circulation Policy Requirements

Numerous policies must be examined and set governing such issues as:

- loan periods
- fines
- recalls
- limits on borrowing
- overdue notices
- delinquency blocks
- reserves
- borrower registration, etc.

The online system will probably be capable of accepting most, but not necessarily all, of the existing policies. These should be reviewed one by one with both the vendor and the library administrations.

3. Initialize the System and Test

All of the policy decisions must be implemented by the vendor as parameter settings for the system. The libraries should then test them out on sample files.

4. Create the Patron File

This should ideally be done via a batch program, custom programmed by the vendor, to extract data from some existing library, payroll or personnel file. Such a program can normally be written in two weeks and can save several months worth of keyboarding.

If the vendor will not support this or suitable existing source files can not be found, then the libraries must reregister their patrons.

5. Train

Training staff for circulation is a little more complex than for catalog searching. Any errors they make may show up as mistakes in patron records causing inconvenience for the patrons and bad public relations for the library.

Ideally, a training/simulation system should be set up to allow the staff to practice on dummy records before handling live circulations.

The system vendor can provide training for supervisors and perhaps a few classes for the general staff. The library circulation supervisors should then prepare themselves to assume ongoing responsibility for training.

6. Phase Out the Old System

The old system should be maintained for check-ins of books checked out under it. All new check-outs should use the new system. The presence or absence of a bar code label, book card or other cue will quickly identify which system should be used for each check-in.

At some point, after some reasonable period of time, the libraries should try to recover all of the books which are still out under the old system. This might involve recall notices, phone calls, visits or whatever the libraries decide is appropriate.

At some still later point, the remaining books checked out should be keyed into the new system or written off and the remaining old circulation files discarded. The entire phase-out process might last around four months from the beginning of the use of the new system.

Acquisitions

The tasks in automating acquisitions are as follows:

1. Study the Vendor Software with Representatives of the Libraries

A number of sensitive areas must be explored, including:

- purchase orders
- checks or payment vouchers
- accounting
- auditing.

2. Establish New Procedures

New procedures may be required for:

- online ordering
- searching
- authorization control
- handling of subscriptions and standing orders
- handling of gifts and exhanges
- file maintenance and inquiry
- accounting, etc.

3. Initialize Parameters

The vendor must study the libraries' procedural requirements and initialize the correct parameters for each of the above items. They should all be tested on sample data.

4. Train

Training may be more complex for this function because of its inherent complexity.

5. Implement

The system would be implemented in all member libraries, with at least order requests and order file inquiries coming from the remote sites and full operations at the host site.

6. Phase Out the Old System

This will probably be a long, drawn-out process in which items continue to come in under the old system for many months. After a certain point, e.g., six months, all outstanding orders should be cancelled or converted and the old system eliminated.

## Serials Control

Serials control has proven to be one of the very hardest functions to automate in a single library. The great variability in subscriptions, publication, volume control, date and other practices of publishers is inherently difficult to represent in a computer.

Some of the best results in serials automation have been achieved by organizations serving multiple libraries, e.g., Ebsco, Faxon, OCLC, Philsum, etc. This is partly because they can manage multiple subscriptions for one publication, thus establishing patterns more easily (e.g., if five libraries receive an issue and one does not, the computers know to claim it).

If serials control is provided by the turnkey vendor and if the package looks usable, then the implementation steps might be:

1. Study the Vendor Software in Light of Libraries' Requirements

   If the software manages subscriptions, many of the same purchasing and accounting issues raised under acquisitions must again be examined. If it handles claiming, it should be compared to the shared systems to see if it is more cost effective.

   The libraries may decide to only partially implement an automated serials system. It may be desirable, for example, to automate check-in, routing, claim alerts and bindery control, while still maintaining manual control over subscriptions and the actual mailing of claim notices.

2. Establish Procedures

   All of the new procedures must be established, including interfaces between automated and manual procedures.

3. Initialize Parameters

As usual, the vendor will have to initialize parameters in accordance with the libraries' use of the system.

4. Create the Files

This part will be difficult. The library may already have bibliographic data in the system. However, additional data may have to be input, including:

- vendor names and addresses
- publishing schedules
- subscription prices and dates
- special rules governing unusual items
- last check-in data
- routing information, etc.

The data will change during the conversion process, making the transition awkward and error prone.

5. Train

Presumably, only a limited number of staff members need to be trained at each library.

6. Implement

7. Phase Out the Old System

The phase-out of the old system may be done in stages, by not checking in any more issues to it. The old check-in records will probably have to be kept, as well as the correspondence files.

Management Information

Every library system comes with a set of "canned" reports. Some vendors are also working on limited nonprocedural report writers. In either case, implementation is very simple.

Preprogrammed reports require no special effort to utilize. As with all other functions, there will be parameters to initialize, but probably no files to create, training to perform, etc. The system administrator and one or two other people can be trained by the vendor to run the reports.

If a report writer exists, the system administrator may need some training to use it - possibly including a class at the vendor's site. After that, people needing special reports would consult with the system administrator to get them. No one else need be affected.

SCHEDULE

The implementation schedule is based on our rough estimates of the time required to implement each of the steps described above.

Actual implementation times will, of course, be dependent upon the specific characteristics of the system selected and the vendor's requirements. The vendor may have to write new software for which time estimates are notoriously difficult to predict. No vendor, to our knowledge, can now provide all functions off the shelf. Hence some development time is required. We have prepared a preliminary schedule showing beginning, completion and elapsed times for each step in Figure 10-1.

Preparation of an RFP and vendor selection are as much administrative as technical activities. We do not know how long it will take to achieve consensus, win approval or begin funding. Our estimates do not try to take these into account.

Figure 10-1.

Implementation Schedule

| | | Begin Month | Completion Month | Months Expended |
|---|---|---|---|---|
| 1. | Preparation of the RFP | | | |
| | a. Achieve consensus | ? | 0 | ? |
| | b. Prepare RFP | 0 | 6 | 6 |
| | c. Prepare committee | 4 | 8 | 4 |
| | d. Release RFP | 6 | 6 | 0 |
| 2. | Vendor Selection | | | |
| | a. Prepare checklists | 6 | 9 | 3 |
| | b. Evaluate technical | 8 | 10 | 2 |
| | c. Evaluate cost | 10 | 11 | 1 |
| | d. Negotiate | 11 | 12 | 1 |
| | e. Award contract | 12 | 12 | 0 |
| 3. | Preparation for Automation | | | |
| | a. Appoint systems administrator | 6 | 8 | 2 |
| | b. Prepare site | 13 | 16 | 3 |
| | c. Procure data | 13 | 16 | 3 |
| | d. Procure supplies | 13 | 16 | 3 |
| | e. Orient staff | 15 | 16 | 1 |
| | f. Install | 16 | 17 | 1 |
| | g. Accept | 17 | 18 | 1 |
| 4. | Implementation | | | |
| | a. Online Catalog | | | |
| | 1) Analyze requirements | 15 | 16 | 1 |
| | 2) Initialize and test | 17 | 18 | 1 |
| | 3) Load data base | 18 | 19 | 1 |
| | 4) Train | 18 | 19 | 1 |
| | 5) Implement at host site | 19 | 19 | 0 |
| | 6) Test and tune | 19 | 21 | 2 |
| | 7) Implement at remote sites | 21 | 22 | 1 |
| | 8) Implement patron access | 22 | 23 | 1 |
| | 9) Implement remote access | 28 | 29 | 1 |
| | 10) Freeze old catalog | 26 | 26 | 0 |
| | 11) Ongoing conversion | 21 | Continuous | Continuous |

Figure 10-1.

Implementation Schedule
(continued)

| | | Begin Month | Completion Month | Months Expended |
|---|---|---|---|---|
| b. | Circulation Control | | | |
| | 1) Develop conversion procedures | 14 | 18 | 5 |
| | 2) Analyze policy requirments | 16 | 19 | 3 |
| | 3) Initialize and test | 18 | 19 | 1 |
| | 4) Create patron file | 19 | 20 | 1 |
| | 5) Train | 20 | 21 | 1 |
| | 6) Implement at host site | 21 | 21 | 0 |
| | 7) Implement at remote sites | 22 | 22 | 0 |
| | 8) Phase out old system | 21 | 26 | 5 |
| c. | Acquisitions (depends on what is available) | | | |
| | 1) Study system requirements | 24 | 28 | 4 |
| | 2) Establish procedures | 28 | 30 | 2 |
| | 3) Initialize and test | 30 | 32 | 2 |
| | 4) Train | 32 | 33 | 1 |
| | 5) Implement | 33 | 33 | 0 |
| | 6) Phase out old system | 33 | 39 | 6 |
| d. | Serials Control (depends on what is available) | | | |
| | 1) Study system requirements | 32 | 36 | 4 |
| | 2) Establish procedures | 36 | 38 | 2 |
| | 3) Initialize and test | 38 | 40 | 2 |
| | 4) Create file | 39 | 45 | 6 |
| | 5) Train | 39 | 45 | 6 |
| | 6) Implement | 45 | 45 | 0 |
| | 7) Phase out old system | 45 | 57 | 12 |
| e. | Management Information (depends on what is available) | | | |
| | 1) Train | 24 | 26 | 2 |
| | 2) Implement | 26 | 26 | 0 |

### 10.2.5 Evaluation and Future Planning

After implementation of the selected design, the operation of the ZOC should be carefully evaluated on a periodic basis. The framework used for the cost analysis of alternatives (detailed in Appendix 1) can be used for such evaluation. Evaluation is often performed in a random fashion and is therefore often not accurate or valid at the time. We, on the other hand, promote ongoing evaluation of systems as they develop so that costly changes and shifts in direction can be made at the earliest possible time. The planning process developed by KRI and the design approach we have established both advocate integrated evaluation procedures. By being evaluated regularly, systems can be responsive to the changing needs of their users and to the rapidly changing environment within which they are situated. The evaluation of networking activities throughout the state should feed back into the planning cycle, of which this study was a part.

## 10.3 Implementation Activities for Libraries

### 10.3.1 Education

The first step that individual libraries should take towards the implementation of networking activities throughout the state is to educate themselves as to the potential for networking in the state. This educational process is directly related to the promotion and feedback activities of the Division of State Library or representative groups thereof. Libraries throughout the state should interact with representatives of the Working Committee and should take advantage of any meetings, seminars or other presentations addressed to networking in the state.

### 10.3.2 Conduct Cost Analyses

After familiarizing themselves with the results of this study and further plans for statewide networking, libraries should apply the cost models (see Section 8 and Appendix 1) to their own environment. Where possible, data

available for the library should be inserted in place of the averages we used. In the absence of readily available data, the cost models can be used as described in this report by simply inserting transaction volumes for the activities performed by the libraries. The results of the analyses will help the libraries in selecting the most appropriate networking approach.

The analyses should be conducted by a planning committee which would represent a single library, a library system or a group of libraries. We also recommended that a person within the Division of State Library be given the responsibility for advising libraries on the performance of cost analyses and the interpretation of results. With such advice, all libraries in the state should be able to conduct "first-cut" cost analyses, either individually or in groups. These analyses should be performed as soon as possible, preferably within six months.

### 10.3.3 Consider Mode of Interaction with the Network

The results of the cost analyses will give libraries an indication of their next step if they are not currently using OCLC (if they are, then the analyses can be used to reevaluate their current operations). If their volume of activity justifies the acquisition of a dedicated OCLC terminal in-house, then steps should be taken to raise funding, and a terminal should be ordered. If the volume of activity is below the level required to justify an in-house terminal, then two options exist. Either the State Library Processing Center should be used, or other libraries in the vicinity should be approached with the notion of terminal sharing. In the former case, the appropriate justifications and applications need to be made to the library authority/administration and the State Library, respectively. In the case of terminal sharing, some further cost analyses may be required to ensure adequate workloads. Furthermore, decisions will have to be made as to the location of the terminal, the scheduling of access and the distribution of costs. Once these decisions have been made, then again the funding needs to be approved and the terminal ordered. In both cases, training will have to be scheduled. To reduce the training costs we recommend that training

be conducted by the State Library. The analyses and decisions should be made by Planning Committees established to oversee networking activities. We anticipate the consideration of interaction with OCLC in the six months following the cost analyses.

### 10.3.4 Evaluation and Future Planning

As mentioned earlier, we advocate the regular, periodic evaluation of progress, with the evaluation results being fed back into the planning process. Once the cost analyses have been conducted once, appropriate data should be collected on a regular basis, thereby facilitating the next cost analysis. We suggest that the analyses be performed annually by each library or group of libraries.

## 10.4 Implementation Activities for Zones of Convenience

### 10.4.1 Preparation and Planning

Before actually implementing any system or setting of any procedures, the ZOC should establish a Planning Committee to oversee the networking activities. This committee should include, at least, one representative of each of the constituents of the ZOC. The Committee should initiate a detailed design study to determine the exact requirements of members, the location of the ILAS, resource requirements (equipment, personnel, funding, etc.), procedures for access, distribution of costs, and so on.

### 10.4.2 Implementing an ILAS

We defined a ZOC as being either an individual library, a library system or a group of libraries sharing resources and offering various services and products to its members. The exact composition of the ZOCs and the functions they perform will vary considerably, and procedures and activities necessary for their establishment and operation are similarly variable. Nevertheless, the ultimate goal of the ZOC should be to provide logical access and physical access to the holdings of its constituents.

The type of interaction with OCLC and the grouping of libraries to share resources also result in the setting up of ZOCs and were discussed in the previous subsection. Here we will assume that ZOC members are already using OCLC via some mechanism.

To a large extent the actual implementation of an ILAS for a ZOC will follow the procedures designed as part of the pilot ZOC project discussed in Section 10.2.4. These include issuing an RFP; evaluating proposals and selecting a vendor; selecting the location and installing the system; and testing, operating and evaluating the system. During these activities, which will take place over a period of several years, the experience and advice of those involved in the pilot project and any subsequent ZOC ILAS implementations should be sought as required.

### 10.4.3 Evaluation and Future Planning

As mentioned above, evaluation should be performed on a regular basis - preferably annually and the results should be fed back into the planning process.

## 10.5 Implementation Schedule

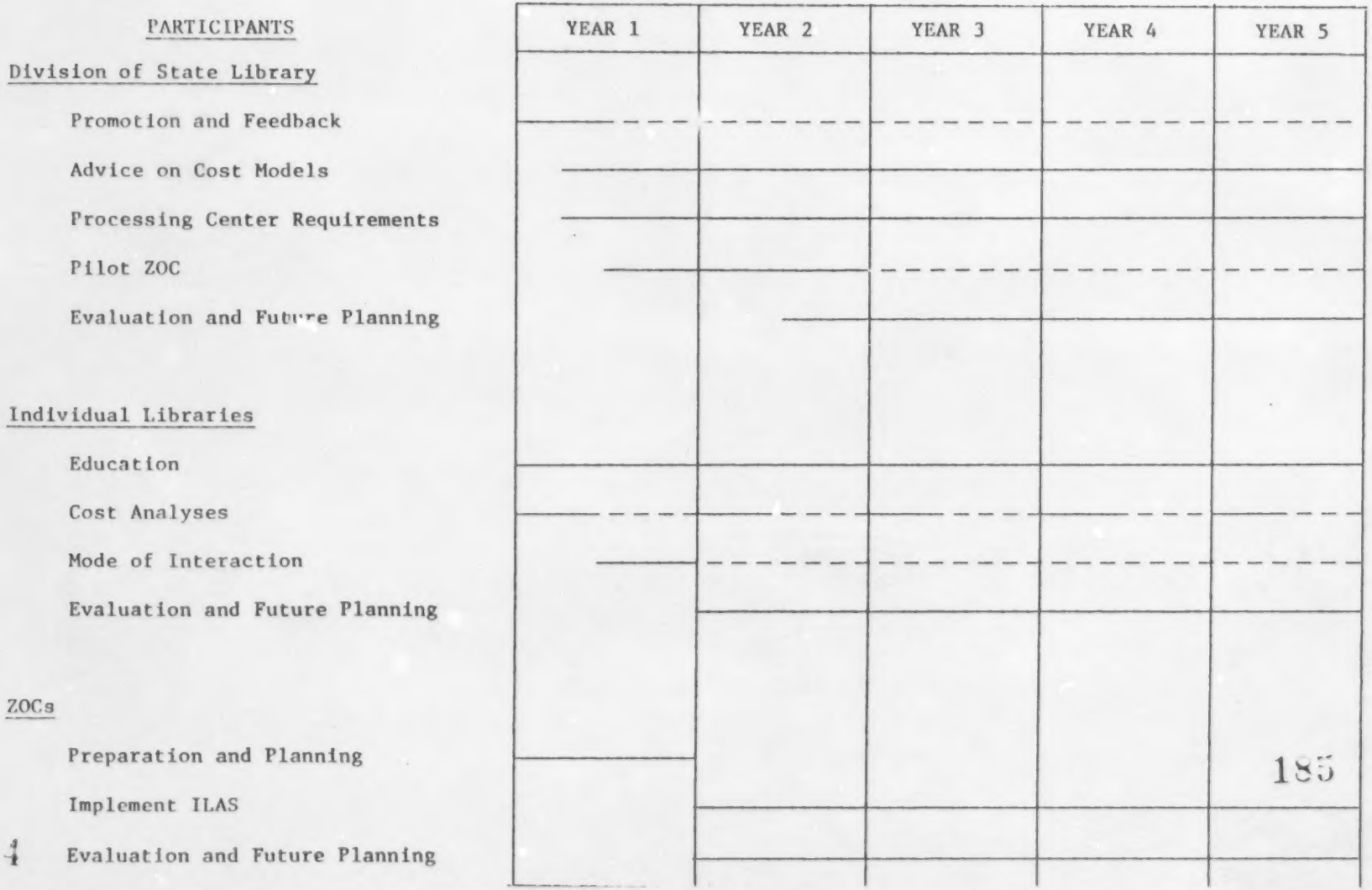
A schedule of the various implementation activities to be performed at several levels is displayed in Figure 10-2. It should be noted that these are only gross estimates of timing and that various libraries will initiate networking activities at different times over the next couple of years. Also, many of the activities are dependent on administrations and funding bodies making commitments and decisions, and delays can be lengthy.

## 10.6 Implementation Costs

The actual costs of implementation will vary according to the analyses and ensuing decisions made by individual libraries and groups of libraries. Nevertheless, a rough estimate of costs is as follows:

Figure 10-2.

Implementation Summary



| | |
|---|---|
| Promotion and feedback: | $ 30,000 |
| Advice on cost models: | $ 15,000 |
| Union list of serials: | $ 50,000 |
| Conversion of State Library Processing Center to SOLINET*: | $ 4,000-$40,000 |
| Pilot Zone of Convenience**: | $100,000-$250,000 |
| Education and future planning: | $ 10,000 p.a. |

* This figure will depend on the number of libraries electing to use the State Library Processing Center. The operating costs can be recovered through subscriptions but a capital investment will be needed up front (although this may also be recovered through the subscriptions).

** The figures include the range of activities that will be required to set up a ZOC, i.e., including the detailed design. The lower estimate represents a ZOC without an ILAS, the upper estimate includes the procurement and installation of an ILAS.

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APPENDIX 1

DETAILED ECONOMIC ANALYSIS OF ALTERNATIVES

APPENDIX 1

DETAILED ECONOMIC ANALYSIS OF ALTERNATIVES

## A1.1 Introduction

In this appendix we discuss the economic implications of alternative approaches for statewide networking activities in North Carolina. In the analysis we have emphasized a bottom up approach where we look at the cost and benefit implications of alternative approaches to automating individual libraries of different sizes. For some large libraries it makes sense to automate some activities; whereas for others it is more economical to share automated facilities with nearby libraries or rely on a centralized service. We will find below that the amount of activity will clearly determine which alternatives are best for an individual library. We then let this analysis dictate which shared facilities or central services make sense. When it is more economical to share facilities or use a centralized service we take a top down approach to economic analysis to assess these alternatives.

As mentioned in the report, the heart of the system is a bibliographic database from which a number of functions can be supported. For this reason, we initially look at networking activities involving cataloging, the results of which can serve as the statewide bibliographic database. Analysis is first performed for cataloging monographs only and then with other materials added, such as serials, audio-visual materials, and state documents and other materials. Then, analysis is performed on circulation systems because there are, in a sense, two general complementary approaches to networking as described in Sections 2 and 7. One is a shared cataloging system with its associated equipment and communication network and the other is an integrated library automation system with its associated equipment and communication network. Some functions are common to each approach so they could be performed either through a cataloging system or through an integrated library automation system.

The economic cost analysis is done by identifying costs associated with performing different combinations of functions by various alternatives such as doing them manually, relying on a central service, using a dedicated

terminal in-house, using a dial-up terminal or sharing terminals with other libraries. The costs are sub-divided by:

(1) Fixed one-time costs such as purchase of equipment, initial training, networking initiation fees, etc.

(2) Fixed costs which recur monthly or yearly such as equipment rental, line charges, annual networking dues, annual training, etc.

(3) Variable costs associated with amount of activity such as number of items cataloged, number of serials ordered and received, etc. Cost elements associated with variable costs include labor, equipment, supplies and communications.

The project did not call for collecting individual library cost data in North Carolina. Therefore, we relied on obtaining costs from a number of sources including past King Research studies, other state and local cost studies (e.g., in Indiana, New York, and Tuscon, Arizona) and from vendors. When possible, we tried to establish production rates for each activity associated with a function (such as cataloging). In so doing, we relied heavily on a study performed by King Research and Damans & Associates on fifteen libraries [14]. In that study we estimated the production rates over a range of items produced by using a simple regression model and analysis. For example, we estimated the production rate for precatalog search as being:

Total Pre-Cataloging Search Cost =
$1473 + (0.07 hours per item) x (labor $ per hour) x
(total number of items searched)

Since the labor rates (salaries) vary by region of the country, we used average southeast region salaries from the 1982 American Library Association Survey of Librarian Salaries [15]. The hourly rates were calculated by dividing annual salaries by 1800 hours and multiplying the number by 1.16 to account for fringe

benefits (as found in the Survey of Librarian Salaries) and 1.50 to account for overhead costs. It is noted that there are normally about 2080 working hours in a year, but we assumed that about 280 hours are spent in vacation, sick leave, holidays, professional development and slack time. Some overhead costs such as rent are covered in the fixed recurring costs. However, some overhead costs such as administration are covered by the multiplication factor mentioned above.

In the sub-sections that follow, we attempt to provide costs for typical libraries over ranges of levels of activities. However, there is no such thing as a "typical" library. Every library is unique. Therefore, even though the results of the cost analysis provide a good feel for what might be expected, individual libraries should consider doing their own customized analysis using the approach given below. In this way, they can be more assured that joining a network or purchasing equipment is the best decision for them. (It is hoped, as a result of our analysis below, that many libraries in the State of North Carolina will see the economic advantages of some approaches to sharing resources or participating in statewide networking.)

## A1.2 Economic Analysis of Cataloging

In the economic analysis of cataloging below, we first look at the following approaches to cataloging monographs:

(1) Manual cataloging
(2) Use of a dedicated OCLC terminal in-house
(3) Use of a dial-up terminal in-house
(4) Sharing a dedicated OCLC terminal with other libraries
(5) Sharing a dial-up terminal with other libraries
(6) Using a centralized service to perform cataloging

The fixed one-time, fixed recurring and variable costs are estimated for each cataloging activity; pre-catalog searching, cataloging (record updating and original cataloging for OCLC), card filing and physical processing.

The break-down of costs of cataloging monographs manually are given in Tables A1.1a, b and c below. The fixed one-time costs associated with

cataloging manually are given in Table A1.1a below:

TABLE A1.1a. DETAILED FIXED ONE-TIME COST ASSOCIATED WITH CATALOGING MANUALLY IN NORTH CAROLINA LIBRARIES: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | Manual | Furniture | $300 |
| | | Training | 250 |
| | | Total | $550 |

The fixed recurring costs associated with cataloging manually are given in Table A1.1b below:

TABLE A1.1b. DETAILED FIXED RECURRING COST ASSOCIATED WITH CATALOGING MANUALLY IN NORTH CAROLINA LIBRARIES: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | Manual | Rent | $ 400 |
| | | Training | 125 |
| | | Set-up | 1,030 |
| | | Total | $1,555 |

The variable costs are given in Table A1.1c on the next three pages.

When aggregated over all fixed one-time, fixed recurring and variable costs (by activities and cost components), the total cost of cataloging manually is described by the equation below:

(1) Total Cost to Catalog Manually =

$1,740 + ($16.13 x No. of Monographs Cataloged)

TABLE A1.1c DETAILED VARIABLE COST OF CATALOGING MANUALLY
IN NORTH CAROLINA LIBRARIES: 1982

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING | | | | | |
| Pre-Cataloging Searching Monographs | Manual | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| Cataloging Monographs | Manual | Total Items Cataloged | Labor<br>Cards | (0.5 hrs/item)x($15.60/hr)<br>(6 cards)x($0.01/card) | $7.80<br>0.06<br>$7.86 |
| Card Filing Monographs | Manual | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Monographs | Manual | Total Items Cataloged | Labor | (0.04 hrs/item)x($15.60/hr) | $0.62 |
| Cataloging Serials | Manual | Total Serial Titles Cataloged | Labor<br>Cards | (0.38 hrs/item)x($15.60/hr)<br>(6 cards)x($0.01/card) | $5.93<br>0.06<br>$5.99 |
| Card Filing Serials | Manual | Total Serial Titles Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Serials | Manual | Total Serial Issues Processed | Labor | (0.04 hrs/item)x($15.60/hr) | $0.62 |

TABLE A1.1c DETAILED VARIABLE COST OF CATALOGING MANUALLY
IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Pre-Cataloging Searching Audiovisual Materials | Manual | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| Cataloging Audiovisual Materials | Manual | Total Items Cataloged | Labor<br>Cards | (0.38 hrs/item)x($15.60/hr)<br>(6 cards)x($0.01/card) | $5.93<br>0.06<br>$5.99 |
| Card Filing Audiovisual Materials | Manual | Total Cards Filed | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Audiovisual Materials | Manual | Total Items Cataloged | Labor | (0.04 hrs/item)x($15.60/hr) | $0.62 |
| Pre-Cataloging Searching State & Other Materials | Manual | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| Cataloging State & Other Materials | Manual | Total Items Cataloged | Labor<br>Cards | (1.00 hrs/item)x($15.60/hr)<br>(6 cards)x($0.01/card) | $15.60<br>0.06<br>$15.66 |

TABLE A1.1c DETAILED VARIABLE COST OF CATALOGING MANUALLY
IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Card Filing State & Other Materials | Manual | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing State & Other Materials | Manual | Total Items Cataloged | Labor | (0.04 hrs/item)x($15.60/hr) | $0.62 |

In this equation, the $1,740 represents fixed cost associated with one-time costs (÷ 3) and recurring costs such as setting up to catalog, rent and so on. The estimated average cost to catalog, file and do physical processing on each individual monograph, serials, audiovisual and other material is given by the equation, to be combined with the number of each item cataloged. The equation assumes an annual cataloger salary of $16,146 and that six cards are produced for every item cataloged. Larger libraries may use less expensive catalogers, but it is assumed that some offsetting supervisory costs would be necessary.

The detailed costs of cataloging using an in-house OCLC terminal are given in Tables A1.2a (b and c). The fixed one-time costs associated with cataloging using an in-house OCLC terminal are:

TABLE A1.2a. DETAILED FIXED ONE-TIME COST ASSOCIATED WITH CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | OCLC Terminal | Display Terminal | $3,700 |
| | In-House | Cables | 24 |
| | | Telephone Installation | 148 |
| | | Furniture | 400 |
| | | Training (labor) | 500 |
| | | Training (travel) | 100 |
| | | Training (SOLINET) | 40 |
| | | TOTAL | $4,912 |

The fixed recurring costs associated with cataloging using an in-house OCLC terminal are:

TABLE A1.2b. DETAILED FIXED RECURRING COST ASSOCIATED WITH CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | OCLC Terminal In-House | Terminal Maintenance | $ 482 |
| | | SOLINET Charge | 60 |
| | | Membership Dues (SOLINET) | 350 |
| | | Telephone | 1,228 |
| | | Lease-line (SOLINET) | 2,820 |
| | | Rent | 500 |
| | | Training (labor) | 250 |
| | | Training (travel) | 100 |
| | | Training (SOLINET) | 40 |
| | | Set-up | 3,847 |
| | | TOTAL | $9,677 |

The variable costs for cataloging using an in-house OCLC terminal are given on the following four pages. The aggregated costs can be computed from the equation below:

(2) Total Cost of Cataloging Using an In-House OCLC Terminal =

$11,314 + ($5.71 x No. of Monographs Cataloged)
+ ($9.12 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($12.79 x Prop. of Monograph Items Not Hit x No. of Monographs)

The fixed cost of $11,314 includes a fixed one-time cost of $4,912 (terminal, cables, telephone installation, furniture, training, etc.) amortized over three years plus $9,677 for recurring cost components as terminal maintenance, telephone, leased line (SOLINET), rent, annual training, SOLINET charges, set-up time and so on. The variable catalog cost includes the SOLINET initiation fee (since it is a function of the size of the library) and the labor, equipment, OCLC database charges, supplies, etc. necessary to perform the catalog activities mentioned above.

TABLE A1.2c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING | | Total Items Cataloged | Initiation Fee Amt. SOLINET | | $0.15 |
| Pre-Catalog Searching Monographs | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.07 hrs/item)x($15.60/hr) | $1.09 |
| OCLC Record Update Monographs | OCLC Terminal In-House | Total Items Hit | Labor | (0.45 hrs/item)x($15.60/hr) | $7.02 |
| | | | Database Charge | ($1.46) | 1.46 |
| | | | SOLINET Charge | ($0.33) | 0.33 |
| | | | Supplies | (6 cards)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards)x($0.01/card) | 0.06 |
| | | | | | $9.12 |
| Original Cataloging Monographs | OCLC Terminal In-House | Total Items Not Hit | Labor | (0.8 hrs/item)x($15.60/hr) | $12.48 |
| | | | Supplies | (6 cards)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards)x($0.01/card) | 0.06 |
| | | | | | $12.79 |
| Card Filing Monographs | OCLC Terminal In-House | Total Cards Filed | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Monographs | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |
| Original Cataloging Serials | OCLC Terminal In-House | Total Serial Titles Cataloged | Labor | (0.3 hrs/item)x($15.60/hr) | $4.68 |
| | | | Supplies | (6 cards)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards)x($0.01/card) | 0.06 |
| | | | | | $4.99 |

TABLE A1.2c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Card Filing Serials | OCLC Terminal In-House | Serial Titles | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Serials | OCLC Terminal In-House | Serial Titles | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |
| Pre-Catalog Searching Audiovisual Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.07 hrs/item)x($15.60/hr) | $1.09 |
| OCLC Record Update Audiovisual Materials | OCLC Terminal In-House | Total Items Hit | Labor<br>Database Charge<br>SOLINET CHARGE<br>Supplies<br>Shipping | (0.26 hrs/item)x($15.60/hr)<br>($1.46)<br>($0.33)<br>(6 cards)x($0.042/card)<br>(6 cards)x($0.01/card) | $4.06<br>1.46<br>0.33<br>0.25<br>0.06<br>$6.16 |
| Original Cataloging Audiovisual Materials | OCLC Terminal In-House | Total Items Not Hit | Labor<br>Supplies<br>Shipping | (0.3 hrs/item)x($15.60/hr)<br>(6 cards)x($0.042/card)<br>(6 cards)x($0.01/card) | $4.68<br>0.25<br>0.06<br>$4.99 |
| Card Filing Audiovisual Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |

TABLE A1.2c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Physical Processing Audiovisual Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |
| Pre-Catalog Searching State & Other Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.07 hrs/item)x($15.60/hr) | $1.09 |
| OCLC Record Update State & Other Materials | OCLC Terminal In-House | Total Items Hit | Labor<br>Database Charge<br>SOLINET Charge<br>Supplies<br>Shipping | (0.26 hrs/item)x($15.60/hr)<br>($1.46)<br>($0.33)<br>(6 cards)x($0.042/card)<br>(6 cards)x($0.01/card) | $4.06<br>1.46<br>0.33<br>0.25<br>0.06<br>$6.16 |
| Original Cataloging State & Other Materials | OCLC Terminal In-House | Total Items Not Hit | Labor<br>Supplies<br>Shipping | (0.9 hrs/item)x($15.60/hr)<br>(6 cards)x($0.042/card)<br>(6 cards)x($0.01/card) | $14.04<br>0.25<br>0.06<br>$14.35 |
| Card Filing State & Other Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |

TABLE A1.2c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Physical Processing State & Other Materials | OCLC Terminal In-House | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |

Another approach is to use a dial-up terminal instead of a dedicated OCLC terminal. The reason for doing this is that the OCLC terminal costs $3,700 and the dedicated lines cost $2,820, but less expensive terminals can be used through other telephone communication facilities such as value-added networks (Tymnet, Telenet, etc.). The estimated costs of cataloging monographs through an in-house dial-up terminal are given in Tables A1.3a (b and c). The fixed one-time costs associated with cataloging using an in-house dial-up are as follows:

TABLE A1.3a. DETAILED FIXED ONE-TIME COST ASSOCIATED WITH CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | In-House | Terminal | $1,000 |
| | Dial-up Terminal | Line Installation & Modem | 160 |
| | (OCLC) | Furniture | 400 |
| | | Authorization | 100 |
| | | Training (labor) | 500 |
| | | Training (travel) | 100 |
| | | Training (SOLINET) | 40 |
| | | TOTAL | $2,300 |

The fixed recurring costs associated with cataloging using an in-house dial-up terminal are given below:

TABLE A1.3b. DETAILED FIXED RECURRING COST ASSOCIATED WITH CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| CATALOGING | In-House | Terminal Maintenance | $ 60 |
| | Dial-up Terminal | Membership Dues (SOLINET) | 350 |
| | (OCLC) | Telephone | 230 |
| | | Rent | 500 |
| | | Communication | 180 |
| | | Training (labor) | 250 |
| | | Training (travel) | 100 |
| | | Training (SOLINET) | 40 |
| | | Set-up | 3,850 |
| | | TOTAL | $5,560 |

The variable costs for cataloging using an in-house dial-up terminal are given on the next four pages. The aggregated cost equation for this alternative is given below:

(3) Total Cost of Cataloging by In-House Dial-Up Terminal =

$6,330 + ($9.84 x No. of Monographs Cataloged)
+ ($9.89 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($15.00 x Prop. of Monograph Items Not Hit x No. of Monographs)

The fixed cost assumes a $1,000 terminal* amortized over three years. The communications cost assumes $4.25 per hour connect time plus some dial-up charge.

Other approaches are to share terminals (either dedicated OCLC or dial-up) or to use a centralized cataloging service. The approach to sharing terminals involves two or more libraries in near proximity sharing a terminal. In this situation, the terminal would be located at one library and other librarians would drive to the library to use it at designated times. There are some problems such as how to allocate fixed costs to the sharing libraries, but even so it is a practical alternative to cataloging manually or purchasing a terminal. Estimated costs of sharing terminals are as follows:

(4) Total Cost of Cataloging Through a Shared OCLC Terminal =

$350 + ($6.82 x No. of Monographs Cataloged)
+ ($9.12 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($12.79 x Prop. of Monograph Items Not Hit x No. of Monographs)

(5) Total Cost of Cataloging Through a Shared Dial-Up Terminal =

$350 + ($10.57 x No. of Monographs Cataloged)
+ ($9.89 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($12.79 x Prop. of Monograph Items Not Hit x No. of Monographs)

The fixed cost in each case represents the SOLINET charge for a consortium membership. Other fixed costs assume a full utilization allocated over 13,000 monographs cataloged (1800 hours) which show up in the per item cost. Both types of shared terminals assume that about one-half of the cataloging requires travel

*Examples of terminal costs are Texas Instruments Series 10 Printer/300 baud ($695), 840 RO Basic Impact Printer/300 baud ($995), 820 RO Basic Impact Printer/1200 baud ($1995).

TABLE A1.3c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA LIBRARIES: 1982

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING | | | Initiation Fee Amort. SOLINET | | $0.15 |
| Pre-Catalog Searching Monographs | In-House Dial-up Terminal (OCLC) | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| | | | Communications | (0.2 hrs/item)x($4.25/hr) | 0.85 |
| | | | | | $5.22 |
| OCLC Record Update Monographs | Dial-up | Total Items Hit | Labor | (0.45 hrs/item)x($15.60/hr) | $7.02 |
| | | | Database Charge | ($1.46/item) | 1.46 |
| | | | SOLINET Charge | ($0.33/item) | 0.33 |
| | | | Communications | (0.18 hrs)x($4.25/hr) | 0.77 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $9.89 |
| Original Cataloging Monographs | Dial-up | Total Items Not Hit | Labor | (0.8 hrs/item)x($15.60/hr) | $12.48 |
| | | | Communications | (0.52 hrs/item)x($4.25/hr) | 2.21 |
| | | | Supplies | (6 cards/item)x($0.042/card) | .25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | .06 |
| | | | | | $15.00 |
| Card Filing Monographs | Dial-up | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Monographs | Dial-up | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |

TABLE A1.3c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Original Cataloging Serials | Dial-up | Serial Titles Cataloged | Labor | (0.3 hrs/item)x($15.60/hr) | $4.68 |
| | | | Communications | (0.20 hrs/item)x($4.25/hr) | 0.85 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $5.84 |
| Card Filing Serials | Dial-up | Serial Titles Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Serials | Dial-up | Serial Titles Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |
| Pre-Catalog Audiovisual Materials | In-House Dial-up Terminal (OCLC) | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| | | | Communications | (0.2 hrs/item)x($4.25/hr) | 0.85 |
| | | | | | $5.22 |
| OCLC Record Update Audiovisual Materials | Dial-up | Items Hit | Labor | (0.26 hrs/item)x($15.60/hr) | $4.06 |
| | | | Database Charge | ($1.46/item) | 1.46 |
| | | | SOLINET Charge | ($0.33/item) | 0.33 |
| | | | Communications | (0.18 hrs)x($4.25/hr) | 0.77 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $6.93 |

TABLE A1.3c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Original Cataloging Audiovisual Materials | Dial-up | Items Not Hit | Labor | (0.3 hrs/item)x($15.60/hr) | $5.77 |
| | | | Communications | (0.52 hrs/item)x($4.25/hr) | 2.21 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $8.29 |
| Card Filing Audiovisual Materials | Dial-up | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing Audiovisual Materials | Dial-up | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |
| Pre-Catalog Searching State & Other Materials | In-House Dial-up Terminal (OCLC) | Total Items Cataloged | Labor | (0.28 hrs/item)x($15.60/hr) | $4.37 |
| | | | Communications | (0.2 hrs/item)x($4.25/hr) | 0.85 |
| | | | | | $5.22 |
| OCLC Record Update State & Other Materials | Dial-up | Items Hit | Labor | (0.26 hrs/item)x($15.60/hr) | $4.06 |
| | | | Database Charge | ($1.46/item) | 1.46 |
| | | | SOLINET Charge | ($0.33/item) | 0.33 |
| | | | Communications | (0.18 hrs/item)x($4.25/hr) | 0.77 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $6.93 |

TABLE A1.3c DETAILED VARIABLE COST OF CATALOGING USING AN IN-HOUSE DIAL-UP TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| CATALOGING (continued) | | | | | |
| Original Cataloging State & Other Materials | Dial-up | Items Not Hit | Labor | (0.9 hrs/item)x($15.60/hr) | $14.04 |
| | | | Communications | (0.52 hrs/item)x($4.25/hr) | 2.21 |
| | | | Supplies | (6 cards/item)x($0.042/card) | 0.25 |
| | | | Shipping | (6 cards/item)x($0.01/card) | 0.06 |
| | | | | | $16.56 |
| Card Filing State & Other Materials | Dial-up | Total Items Cataloged | Labor | (0.035 hrs/item)x($15.60/hr)x(6) | $3.28 |
| Physical Processing State & Other Materials | Dial-up | Total Items Cataloged | Labor | (0.076 hrs/item)x($15.60/hr) | $1.19 |

costs of $0.24 per item. (50 miles at $0.225/mile, 1.25 hours of staff time, 50 items cataloged per trip). Sharing an OCLC terminal appears to be better.

Another approach is to use a centralized cataloging service (statewide or regional). The estimated cost to individual libraries that would use such a service is:

(6) Total Cost of Cataloging Through a Centralized Service =

$350 + ($6.22 x No. of Monographs Cataloged)
+ ($9.12 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($12.79 x Prop. of Monograph Items Not Hit x No. of Monographs)

In this case we assume that requests will be mailed (or telephoned) to a central service and a sufficient number of OCLC dedicated terminals will be employed (at 3,000 hours a year each) to catalog all the monographs input to them. It is also assumed that lower salaried catalogers will be used, but that overhead of the service partially compensates for the difference. It is clear that a centralized service is likely to cost less than shared terminals. However, some control is lost and there may be some time delay in receiving cataloged cards.

In reviewing the six approaches over a range of monograph cataloging volumes, under the assumptions stated above, we find for an individual library that it is always more expensive for an individual library to catalog manually, regardless of size. Generally, it is least expensive to use a centralized service, although use of an in-house or shared OCLC terminal is only about $0.50 per item cataloged more, if the terminal is fully utilized and labor costs are comparable to those likely to be found in a centralized facility. Use of a dial-up terminal in-house or shared is generally more expensive than use of an OCLC terminal; particularly over volumes of workload where central services are not particularly advantageous. It is emphasized that there will be some circumstances where the costs shift so that the cost estimates above will not always hold. Obviously, sharing an OCLC terminal is nearly as inexpensive as using a centralized service, and there may be circumstances where dial-up may be better. Other factors also need to be considered as well such as control, performance, needs for standards, etc. Also, the example above involves cataloging of monographs only.

The results change if a library also catalogs other materials as well and/or if a library uses the terminals to help perform other functions such as acquisitions, interlibrary loans and circulation. Cost examples are given below for cataloging other materials.

(7) Total Cost to Catalog all Materials Manually =

$1,740 + ($16.13 x No. of Monographs Cataloged)
+ ($9.89 x No. of Serial Titles Cataloged)
+ ($14.26 x No. of Audiovisual Materials Cataloged)
+ ($23.93 x No. of State & Other Materials Cataloged)

(8) Total Cost of Cataloging all Materials Using an In-House OCLC Terminal =

$11,314 + ($5.71 x No. of Monographs Cataloged)
+ ($9.12 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($12.79 x Prop. of Monograph Items Not Hit x No. of Monographs)
+ ($5.56 x No. of Serials Cataloged)
+ ($6.16 x Prop. of Serial Titles Hit x No. of Serial Titles)
+ ($4.99 x Prop. of Serial Titles Not Hit x No. of Serial Titles)
+ ($5.56 x No. of AV Materials Cataloged)
+ ($6.16 x Prop. of AV Materials Hit x No. of AV Materials)
+ ($4.99 x Prop. of AV Materials Not Hit x No. of AV Materials)
+ ($5.56 x No. of State & Other Materials Cataloged)
+ ($6.16 x Prop. of State & Other Materials Hit x No. of State & Other Materials)
+ ($14.35 x Prop. of State & Other Materials Not Hit x No. of State & Other Materials)

(9) Total Cost of Cataloging all Materials by In-House Dial-Up Terminal =

$6,330 + ($9.84 x No. of Monographs Cataloged)
+ ($9.89 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($15.00 x Prop. of Monograph Items Not Hit x No. of Monographs)
+ ($9.69 x No. of Serials Cataloged)
+ ($6.93 x Prop. of Serial Titles Hit x No. of Serial Titles)
+ ($8.29 x Prop. of Serial Titles Not Hit x No. of Serial Titles)
+ ($9.69 x No. of AV Materials Cataloged)
+ ($6.93 x Prop. of AV Materials Hit x No. of AV Materials)
+ ($8.29 x Prop. of AV Materials Not Hit x No. of AV Materials)
+ ($9.69 x No. of State & Other Materials Cataloged)
+ ($6.93 x Prop. of State & Other Materials Hit x No. of State & Other Materials
+ ($16.56 x Prop. of State & Other Materials Not Hit x No. of State & Other Materials)

(10) Total Cost of Cataloging all Materials Using a Shared OCLC Terminal =

$350 + ($6.82 x No. of Monographs Cataloged)
+ ($10.23 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($13.90 x Prop. of Monograph Items Not Hit x No. of Monographs)
+ ($6.67 x No. of Serials Cataloged)
+ ($7.27 x Prop. of Serial Titles Hit x No. of Serial Titles)
+ ($6.10 x Prop. of Serial Titles Not Hit x No. of Serial Titles)
+ ($6.67 x No. of AV Materials Cataloged)
+ ($7.27 x Prop. of AV Materials Hit x No. of AV Materials)
+ ($6.10 x Prop. of AV Materials Not Hit x No. of AV Materials)
+ ($6.67 x No. of State & Other Materials Cataloged)
+ ($7.27 x Prop. of State & Other Materials Hit x No. of State & Other Materials)
+ ($15.46 x Prop. of State & Other Materials Not Hit x No. of State & Other Materials)

(11) Total Cost of Cataloging all Materials Using a Shared Dial-Up Terminal =

$350 + ($10.57 x No. of Monographs Cataloged)
+ ($10.62 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($15.73 x Prop. of Monograph Items Not Hit x No. of Monographs)
+ ($10.42 x No. of Serials Cataloged)
+ ($7.66 x Prop. of Serial Titles Hit x No. of Serial Titles)
+ ($9.02 x Prop. of Serial Titles Not Hit x No. of Serial Titles)
+ ($10.42 x No. of AV Materials Cataloged)
+ ($7.66 x Prop. of AV Materials Hit x No. of AV Materials)
+ ($9.02 x Prop. of AV Materials Not Hit x No. of AV Materials)
+ ($10.42 x No. of State & Other Materials Cataloged)
+ ($7.66 x Prop. of State & Other Materials Hit x No. of State & Other Materials
+ ($17.29 x Prop. of State & Other Materials Not Hit x No. of State & Other Materials)

(12) Total Cost of Cataloging all Materials Using a Central Service =

$350 + ($6.22 x No. of Monographs Cataloged)
+ ($9.63 x Prop. of Monograph Items Hit x No. of Monographs)
+ ($13.30 x Prop. of Monograph Items Not Hit x No. of Monographs)
+ ($6.07 x No. of Serials Cataloged)
+ ($6.67 x Prop. of Serial Titles Hit x No. of Serial Titles)
+ ($5.50 x Prop. of Serial Titles Not Hit x No. of Serial Titles)
+ ($6.07 x No. of AV Materials Cataloged)
+ ($6.67 x Prop. of AV Materials Hit x No. of AV Materials)
+ ($5.50 x Prop. of AV Materials Not Hit x No. of AV Materials)
+ ($6.07 x No. of State & Other Materials Cataloged)
+ ($6.16 x Prop. of State & Other Materials Hit x No. of State & Other Materials)
+ ($14.86 x Prop. of State & Other Materials Not Hit x No. of State & Other Materials)

It is noted that the fixed one-time and recurring costs of an OCLC terminal are shared by all materials cataloged. Thus, if monographs are already being cataloged using an in-house (or shared) OCLC terminal and there is time left on the terminal, the fixed costs have already been incurred so that, in a sense, the cost of cataloging serials, audiovisual materials and/or state and other materials is the variable cost. Thus, a decision in that case would be based on comparing only variable costs to the entire cost of alternatives. The same philosophy holds for other functions that can be performed through an OCLC terminal (or dial-up) as well. For example, the OCLC utility service and terminal facility can be used for interlibrary loan requesting, acquisition and serial control. The latter two functions can also be performed using other generic alternative automated systems such as an integrated library automation system (ILAS) or a stand-alone computer system. It will be shown later that decisions concerning which generic alternative to use will depend on availability of hardware or terminals after the basic functions are taken care of (i.e., cataloging and catalog production for OCLC terminals and circulation and online catalog searching for the ILAS and stand-alone computers). The next section discusses interlibrary loan requesting through OCLC since that is the most practical automated alternative. Then the next section discusses circulation and online catalog searching. The final section deals with acquisition and serial control which can be done by either the OCLC utility or ILAS or stand-alone computer.

## A1.3 Economic Analysis of Interlibrary Loan Requesting

In this section, we discuss the costs associated with interlibrary loan requesting. There are two alternatives that we investigate including current procedures and an interlibrary lending network made available through the OCLC/SOLINET system. In the latter instance, what we recommend is that all participating state libraries input their serials holdings (title only), in addition to other materials, into the OCLC system with a marker indicating availability as well as holding. The totality of holdings can be considered a union list of serials and could be output in printed form as well as made available through in-house or shared OCLC terminals (or dial-up terminals) or through a centralized service. Below detailed costs are given for the two basic alternatives.

The fixed one-time costs associated with a non-automated interlibrary loan request system would be in the neighborhood of $300 for furniture and about

$250 for training. The fixed recurring costs for this function would be about the same as manual cataloging - $1,555 (i.e., $400 for rent, $125 for annual training and $1,030 for set-up). There are variable costs associated with both filled and unfilled interlibrary loan requests. The costs of unfilled requests include those which must be sent to a sequence of libraries in order to find one that can fill the request. The extent to which requests must be repeated is found, using the following equation:

$$U = (1 - P) \sum_{n=1}^{\infty} P^n$$

where U is the number of unfilled requests expressed as the proportion of total interlibrary loan requests and P is the expected proportion of filled loan requests. It is assumed that 60 percent of the requests are filled so that multiple requests are found by the equation. Thus, one must add the cost of unfilled loan requests to 0.7 of the requests. The variable costs of a filled interlibrary loan are given below:

TABLE A1.4. DETAILED VARIABLE COSTS OF INTERLIBRARY LOAN REQUESTS IN NORTH CAROLINA LIBRARIES: 1982

| Function | Unit | Cost Component | Cost/Unit Calculations | Cost/Unit ($) |
|---|---|---|---|---|
| Interlibrary Loan Request (Filled) | Total Requests | Labor | (0.92 hrs/item) | $14.46 |
| | | Supplies | x ($15.75/hr.) | 0.14 |
| | | Communications | | 0.09 |
| | | Delivery Service | | 0.02 |
| | | Photocopy | | 0.58 |
| | | Postage & Insurance | | 0.56 |
| | | | TOTAL | $15.85 |
| Interlibrary Loan Request (Unfilled) | Total Requests | Labor | (0.42 hrs/item) | $ 6.58 |
| | | Supplies | x ($15.75/hr.) | 0.05 |
| | | Communications | | 0.04 |
| | | Postage & Insurance | | 0.26 |
| | | | TOTAL | $ 6.93 |

The cost equation for typical interlibrary loan requests without the benefit of a union list of serials is:

(13) Total Cost of Interlibrary Loan Requesting Through Non-Automated Means =

$15.85 + [($6.93) x (0.7) x (No. of Interlibrary Loan Requests)]

The principal alternative to the current typical interlibrary lending system would be the OCLC sub-system through an in-house OCLC terminal, sharing an OCLC terminal or using a centralized system. The fixed one-time and recurring costs are the same as those estimated for the OCLC cataloging systems. The variable costs for these systems are estimated below.

The first alternative is an in-house OCLC terminal.

TABLE A1.5. DETAILED VARIABLE COSTS OF INTERLIBRARY LOAN REQUESTS IN NORTH CAROLINA LIBRARIES: 1982

| Function | Unit | Cost Component | Cost/Unit Calculations | Cost/Unit ($) |
|---|---|---|---|---|
| Searching | Total Requests | Labor | (0.07 hrs/item) | $1.10 |
| | | Database Charge | x ($15.75/hr.) | 0.11 |
| | | TOTAL | | $1.21 |
| Request | Total Requests | Labor | (0.08 hrs/item) | $1.26 |
| | | Database Charge | x ($15.75/hr.) | 1.26 |
| | | SOLINET Charge | | 0.14 |
| | | TOTAL | | $2.66 |
| Request Preparation | Total Requests | Labor | (0.4 hrs/item) x ($15.75/hr.) | $6.30 |
| Input | | Labor | (0.08 hrs/item) | $1.26 |
| | | Delivery Service | x ($15.75/hr.) | 0.02 |
| | | Supplies | | 0.01 |
| | | Insurance | | 0.06 |
| | | TOTAL | | $1.35 |

The variable costs for interlibrary loan requests using an in-house OCLC terminal is about $11.52. If we allocate the one-time fixed costs and fixed recurring

costs over 1800 hours to the interlibrary loan requests, we come up with an additional cost of $0.57 (i.e., 0.15 hours/item x $3.78/hr). Thus, the total cost using this alternative is $12.09 per interlibrary loan requested.

The cost of sharing an OCLC terminal would be the same as using an in-house terminal except an additional cost would be travelling to and from the facility housing the shared terminal which comes to about $0.62 per interlibrary loan request assuming that the travel cost is shared with other uses of the terminal. Finally, the cost of using a centralized service would involve a fixed cost of $350 for participation and the remaining fixed costs allocated over 3000 hours to result in an additional cost of about $0.34 per interlibrary loan request plus postage and communication cost of about $0.29 per request. Thus, the cost equations are as follows:

(14) Total Cost of Interlibrary Loan Requesting by Using an In-House OCLC Terminal =

($12.09 x No. of Interlibrary Loan Requests)

(15) Total Cost of Interlibrary Loan Requesting by Sharing an OCLC Terminal =

($12.71 x No. of Interlibrary Loan Requests)

(16) Total Cost of Interlibrary Loan Requesting Using a Central Service =

($12.15 x No. of Interlibrary Loan Requests)

Thus, all automated services are substantially less expensive than using a non-automated approach which is at least $15.85 per interlibrary loan request and becomes considerably higher as the proportion of unfilled requests goes up (e.g., the cost goes up to $20.70 with 40 percent unfilled requests). The choice among the alternative automated OCLC systems seems to depend on access to an OCLC terminal (or dial-up terminal) and the trade-off cost and delay time of communicating with a shared facility or central service.

## A1.4 Economic Analysis of Circulation and Other Technical Processing Functions

Just as cataloging forms the heart of the OCLC utility and its subsystems, circulation forms the core of integrated library automation system which has several modules in addition to circulation such as acquisitions and catalog searching. In this section, we discuss the costs associated with circulation. The circulation activities include:

| | Ave. Hours/Week Spent by Library Personnel |
|---|---|
| Registration of Borrowers | 16.7 |
| Maintenance of Registration File | 3.4 |
| Preparation of Registration Cards/Records | 11.7 |
| Check-out/Check-in | 117.8 |
| Overdues | 59.3 |
| Reserves | 16.8 |
| Locator File | 11.9 |
| Films Bookings | 2.9 |
| Collection Management | 20.9 |
| Materials Preparation | 56.3 |
| Statistics | 9.7* |
| Planning & Management | 16.0* |
| Shelving | 97.0 |
| ILL | 21.6* |
| Inquiry | 29.9 |
| Total | 434.6 |

*Not Included in Total

The circulation activities are described in further detail below.

### Circulation Activities

1. Setup activities (in manual system)
   - change dates on changing machines
   - due date stamping on set of checkout cards (unless use stamp)
   - count previous days circulation
   - file book cards

2. Registration of new patrons
   - patron fills out application
   - patron identification verified
   - staff checks registration files
   - applications filed
   - library cards produced
   - patron library card produced
   - registration files weeded

3. Lending service (charging)
   - charge item with book and patron identification
   - put due date on item loaned (card or stamp)

4. Lending services (discharging)
   - locate book identified for discharge
   - compute fines for overdues
   - prepare and update patron delinquency

5. Prepare overdue notices
   - pull item identity for overdue items
   - sort by patron identification
   - check master file for patron's home address
   - produce triplicate overdue notices
   - send overdue notices (all 3 if necessary) at intervals
   - produce invoice/legal document if items returned

6. Reserves
   - check catalog for item
   - check staff for item
   - check if item circulating - if found attach reserve
   - check on-order file if not found above
   - fill out the forms for items not found above

7. Circulation statistics
   - keep daily circulation statistics
   - prepare monthly circulation report

Comparing the weekly labor hours of fourteen libraries against their weekly circulation, we derived the following equation for circulation:

(17) Total Manual Circulation Cost =

$925 + ($0.23 x No. of Items Circulated)

The fixed cost includes furniture, rent and set-up time. The variable cost is derived from the following cost calculation: (0.0125 hrs/item) x ($15.75/hr.) per item circulated plus supplies which is $0.03 per item circulated.

It appears that it may be better to share resources (on a local basis) for such functions as circulation. If this is done, one must consider the following fixed one-time costs:

TABLE A1.6a. DETAILED FIXED ONE-TIME COSTS ASSOCIATED WITH CIRCULATION (OR OTHER TECHNICAL PROCESSING) USING A SHARED ILAS IN NORTH CAROLINA LIBRARIES*: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| Circulation (or other technical processing) | ILAS | Computer | $150,000 |
| | | Terminals | 9,895 |
| | | Modems | 275 |
| | | Furniture | 550 |
| | | Initial Training | 2,750 |
| | | TOTAL | $163,470 |

*Seven or eight medium libraries.

The fixed recurring costs are as follows:

TABLE A1.6b. DETAILED FIXED RECURRING COSTS ASSOCIATED WITH CIRCULATION (OR OTHER TECHNICAL PROCESSING) USING A SHARED ILAS IN NORTH CAROLINA LIBRARIES*: 1982

| Function | Network Access | Cost Component | Cost ($) |
|---|---|---|---|
| Circulation (or other technical processing) | ILAS | Rent | $2,750 |
| | | Maintenance | 365 |
| | | Communications | 935 |
| | | Ongoing Training | 1,375 |
| | | TOTAL | $5,425 |

The variable costs to individual libraries are given below in Table A1.6c. The variable costs to the shared facility are given in Tables A1.6d and A1.6e.

The separate acquisitions costs found through manual means is given in Table A1.7 and comparable costs for utilizing the OCLC acquisitions sub-system is given in Table A1.8.

TABLE A1.6c. DETAILED VARIABLE COSTS (TO LIBRARIES) ASSOCIATED WITH ACQUISITIONS USING A SHARED ILAS IN NORTH CAROLINA LIBRARIES: 1982

| Functional Activity | Unit | Cost Component | Cost/Unit Calculations | Cost/Unit ($) |
|---|---|---|---|---|
| **MONOGRAPHS** | | | | |
| Ordering | Total Items Ordered | Labor | (0.017 hrs./ item x $15.60/hr.) | $0.27 |
| | | Communications | | 0.09 |
| Total | | | | $0.36 |
| **SERIALS** | | | | |
| Ordering | Total Items Ordered | Labor | (0.017 hrs./ item x $15.36/hr.) | $0.26 |
| | | Communications | | 0.09 |
| Total | | | | $0.35 |
| Check-in | No. of Titles<br>No. of Issues | Database Ch.<br>Labor<br>Supplies | (0.03 hrs./ item x $15.36/hr.) | $0.25<br>0.46<br>0.01 |
| Total | | | | $0.72 |
| Routing | Titles Routed | Labor | (0.017 hrs./ item x $15.36/hr.) | $0.26 |
| | | Supplies | | 0.10 |
| Total | | | | $0.36 |
| Binding Preparation | Volumes Bound | Labor | (0.017 hrs./ item x $15.36/hr.) | $0.26 |

TABLE A1.6d. DETAILED VARIABLE COSTS ASSOCIATED WITH MONOGRAPH ACQUISITIONS USING A SHARED ILAS IN NORTH CAROLINA LIBRARIES: 1982

| Functional Activity | Unit | Cost Component | Cost/Unit Calculations | Cost/Unit ($) |
|---|---|---|---|---|
| Ordering | Total Items Ordered | Labor | (0.12 hrs./ item x $15.75/hr.) | $1.89 |
| | | Database Charge | | 1.40 |
| | | Supplies | | 0.08 |
| Total | | | | $3.37 |
| Receipt Processing | Total Items Received | Labor | (0.03 hrs./ item x $15.75/hr.) | $0.47 |
| | | Acct. Rec. | | 0.01 |
| | | Order Rec. | | 0.01 |
| Total | | | | $0.49 |

TABLE A1.6e. DETAILED VARIABLE COSTS ASSOCIATED WITH SERIAL ACQUISITIONS USING A SHARED ILAS IN NORTH CAROLINA LIBRARIES: 1982

| Functional Activity | Unit | Cost Component | Cost/Unit Calculations | Cost/Unit ($) |
|---|---|---|---|---|
| Ordering | | | | |
| Initial Input of Record | No. of Titles | Labor | (0.05 hrs. x $15.36/hr.) | $0.77 |
| | | Database Ch. | | 1.73 |
| Total | | | | $2.50 |
| Reissue or Delete | No. of Titles | Labor | (0.03 hrs. x $15.36/hr.) | $0.46 |
| Order Production | No. of Titles | Labor | (0.033 hrs. x $15.36/hr.) | $0.51 |
| | | Supplies | | 0.07 |
| Total | | | | $0.58 |
| Claiming | No. of Issues Claimed | Labor | (0.02 hrs. x $15.36/hr.) | $0.31 |
| | | Supplies | | 0.01 |
| Total | | | | $0.32 |
| Binding | No. of Titles Bound | Labor | (2 x 0.07 hrs. x $15.36/hr.) | $2.14 |
| | | Supplies | | 0.02 |
| Total | | | | $2.16 |

TABLE A1.7 DETAILED VARIABLE COST OF ACQUISITIONS BY MANUAL MEANS IN NORTH CAROLINA LIBRARIES: 1982

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| ACQUISITIONS | | | | | |
| Ordering Monographs | Manual | Monograph Titles Ordered | Labor<br>Supplies | (0.22 hrs/item)x($15.75/hr)<br>($0.05/item) | $3.47<br>.05<br>$3.52 |
| Receiving Monographs | Manual | Monograph Items Received | Labor<br>Supplies | (0.06 hrs/item)x($15.75/hr)<br>($0.05/item) | $0.95<br>0.05<br>$1.00 |
| Ordering Serials | Manual | Serial Titles | Labor<br>Supplies | (0.22 hrs/item)x($15.36/hr)<br>($0.05/item) | $3.38<br>0.05<br>$3.43 |
| Check-in Serials | Manual | Issues Checked-in | Labor<br>Supplies | (0.03 hrs/item)x($15.36/hr)<br>($0.48/item) | $0.46<br>0.48<br>$0.94 |
| Claiming Serials | Manual | Issues Claimed | Labor<br>Supplies | ($0.07 hrs/item)x($15.36/hr)<br>($0.05/item) | $1.08<br>0.05<br>$1.13 |
| Routing Serials | Manual | Titles Routed | Labor<br>Supplies | (0.96 hrs/item)x($15.36/hr)<br>($0.10/item) | $14.75<br>0.10<br>$14.85 |
| Ordering Audiovisual Materials | Manual | Materials Ordered | Labor<br>Supplies | (0.22 hrs/item)x($15.39/hr)<br>($0.05/item) | $3.39<br>0.05<br>$3.44 |

TABLE A1.7 DETAILED VARIABLE COST OF ACQUISITIONS BY MANUAL MEANS IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| ACQUISITIONS (continued) | | | | | |
| Receiving Audiovisual Materials | Manual | Materials Received | Labor<br>Supplies | (0.033 hrs/item)x($15.39/hr)<br>($0.05/item) | $0.51<br>0.05<br>$0.56 |
| Ordering State & Other Materials | Manual | State & Other Material Ordered | Labor<br>Supplies | (0.22 hrs/item)x($17.18/hr)<br>($0.05/item) | $3.78<br>0.05<br>$3.83 |
| Receiving State & Other Materials | Manual | State & Other Materials Ordered | Labor<br>Supplies | (0.033 hrs/item)x($17.18/hr)<br>($0.05/item) | $0.57<br>0.05<br>$0.62 |

TABLE A1.8 DETAILED VARIABLE COST OF ACQUISITIONS BY IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| ACQUISITIONS | | | Initiation Fee Amt. SOLINET | | $0.15 |
| Ordering Monographs | OCLC Terminal In-House | Monographs Ordered | Labor<br>Database Charge<br>Supplies | (0.13 hrs/item)x($15.75/hr)<br>($1.30/item)<br>($0.22/item) | $2.05<br>1.30<br>0.22<br>$3.57 |
| Receiving Monographs | | Monographs Received | Labor<br>Acct. Receipts<br>Order Receipts | (0.033 hrs/item)x($15.75/hr)<br>($0.11/item)<br>($0.11/item) | $0.52<br>0.11<br>0.11<br>$0.74 |
| Ordering Serials | OCLC Terminal In-House | | | | |
| Initial Input of Records | | Serial Titles | Labor<br>Database Charge | (0.13 hrs/item)x($15.36/hr)<br>($1.30/item) | $2.00<br>1.30<br>$3.30 |
| Reissue or Delete | | Serial Titles | Labor | (0.03 hrs/item)x($15.36/hr) | $0.46 |
| Order Production | | | Labor<br>Supplies | (0.033 hrs/item)x($15.36/hr)<br>($0.22/item) | $0.51<br>0.22<br>$0.73 |

TABLE A1.8 DETAILED VARIABLE COST OF ACQUISITIONS BY IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| ACQUISITIONS (continued) | | | | | |
| Check-in Serials | | Serial Titles | Labor<br>Database Charge | (0.03 hrs/item)x($15.36/hr)<br>(0.065)x(1.15 for SOLINET) | $0.46<br>0.07<br>$0.53 |
| Claiming Serials | | Number of Issues Claimed | Labor<br>Database Charge<br>Supplies | (0.02 hrs/item)x($15.36/hr)<br>($0.54+0.32)x(1.15)/item<br>($0.11/item) | $0.31<br>0.99<br>0.11<br>$1.41 |
| Routing Serials | OCLC Terminal In-House | Number of Titles | Labor<br>Supplies | (0.033 hrs/item)x($15.36/hr)<br>($0.01/item) | $0.51<br>0.01<br>$0.52 |
| Ordering Audiovisual Materials | OCLC Terminal In-House | Audiovisual Materials Ordered | Labor<br>Database Charge<br>Supplies | (0.13 hrs/item)x($15.39/hr)<br>($1.30/item)<br>($0.22/item) | $2.00<br>1.30<br>0.22<br>$3.52 |
| Receiving Audiovisual Materials | | Audiovisual Materials Received | Labor<br>Acct. Receipts<br>Order Receipts | (0.033 hrs/item)x($15.39/hr)<br>($0.11/item)<br>($0.11/item) | $0.51<br>0.11<br>0.11<br>$0.73 |

TABLE A1.8 DETAILED VARIABLE COST OF ACQUISITIONS BY IN-HOUSE OCLC TERMINAL IN NORTH CAROLINA LIBRARIES: 1982
(continued)

| Function/ Activity | Network Access | Unit | Cost Component | Cost/Unit Calculation | Cost/Unit ($) |
|---|---|---|---|---|---|
| ACQUISITIONS (continued) | | | | | |
| Ordering State & Other Materials | OCLC Terminal In-House | State & Other Materials Ordered | Labor<br>Database Charge<br>Supplies | (0.13 hrs/item)x($17.18/hr)<br>($1.30/item)<br>($0.22/item) | $2.23<br>1.30<br>0.22<br>$3.75 |
| Receiving State & Other Materials | | State & Other Materials Received | Labor<br>Acct. Receipts<br>Order Receipts | (0.033 hrs/item)x($17.18/hr)<br>($0.11/item)<br>($0.11/item) | $0.57<br>0.11<br>0.11<br>$0.79 |

APPENDIX 2

BACKGROUND MATERIALS CIRCULATED PRIOR TO HEARINGS

NORTH CAROLINA DEPARTMENT OF CULTURAL RESOURCES

Raleigh,
North Carolina
27611

Division of State Library
David N. McKay, Director

Sara W. Hodgkins,
Secretary
James B. Hunt, Jr.,
Governor

January 13, 1982

M E M O R A N D U M

TO:

FROM: Marge Lindsey, Consultant for Multitype Library Cooperation Marge Lindsey

SUBJECT: Public Hearings Conducted by King Research, Inc., as part of a North Carolina Networking Feasibility Study

Public hearings to assess the needs and preferences of librarians from all types of libraries, their library users, Friends and Trustees, and of local government officials, concerning a statewide library network, will be held as follows:

| | |
|---|---|
| February 9, 1982 | 1:30-4:30 p.m. Auditorium, Public Library of Charlotte and Mecklenburg County, Charlotte |
| February 11, 1982 | 1:30-4:30 p.m. Auditorium, Pack Memorial Library, Asheville |
| February 16, 1982 | 1:30-4:30 p.m. Auditorium, Greensboro Public Library, Greensboro |
| February 18, 1982 | 1:30-4:30 p.m. Auditorium, Willis Building, Regional Development Institute, East Carolina University, Greenville |

The following questions will serve as discussion points at the hearings:

1. What existing cooperative activities does your library participate in?
2. What are your existing or planned library automation activities?
3. From your point of view, how would you envision a statewide library network that would meet your needs?
4. Which of your library services could be enhanced by some degree of participation in a statewide library network?
5. What are the conditions that foster the development of a statewide library network?
6. What are the conditions that inhibit the development of a statewide library network?
7. Given two or more different approaches to a statewide library network, what are the most important criteria for evaluating the approaches?

The moderator for the hearings will be Doug Zweizig of King Research, Inc. Local contacts will be the host librarians: Arial Stephens, Director, Public Library of Charlotte and Mecklenburg County, 704/374-2725; Kenneth Brown, Director, Asheville-Buncombe Library System, 704/252-8701; George Viele, Director, Greensboro Public Library, 919/373-2474; Dr. Ruth Katz, Associate Director, J.Y. Joyner Library, East Carolina University, 919/757-6514. State Library Coordinator is Marge Lindsey, 919/733-2570.

Copies of the Request for Proposal and the proposal of King Research, Inc., will be placed in the libraries of the hearing sites and at the State Library for examination or lending to interested persons.

We cordially invite all interested persons to attend the hearing at the most convenient site. Time constraints limit the number of sites and force us to schedule hearings in the winter season, but we hope many will attend. We strongly encourage all who wish to send written comments to King Research as noted in the attached Background Paper. Hearing presentations, addressing the discussion points listed in this memo, will be limited to a maximum of seven minutes per person, with an additional three minutes for discussion. All comments, whether written or oral, should be given freely and absolutely candid.

We are counting on your valuable opinions to allow King Research, Inc., to produce a final report with recommendations that can provide a firm base for realistic and productive future planning.

ML:pch

BACKGROUND PAPER
NORTH CAROLINA NETWORKING FEASIBILITY STUDY

North Carolina has long viewed its libraries as among the State's primary resources enhancing economic and cultural growth. The State has over 2,500 libraries, which together house over 40,000,000 books, 282,000 serials (titles), and employ more than 7,000 FTE staff. The sharing of library resources has a distinguished history in North Carolina.

The coordination of cooperative development among various types of libraries was specifically assigned to the Department of Cultural Resources (Division of State Library) by the 1977 session of the North Carolina General Assembly. The legislation also provided guidance in how this responsibility was to be met, stating that "cooperative library development should be based on the sound foundation of current successful programs, that it should be the product of a joint effort representing the needs of all libraries, and that the emphasis should be on planning and coordination of a decentralized system rather than an attempt to centralize or bureaucratize the State's cooperative effort."[1]

In 1977, the State Library appointed representatives from all types of libraries to an Ad Hoc Committee on Multitype Library Cooperation. This committee merged with the NCLA Networking Committee in 1979. A Technical Subcommittee was formed in early 1981. As a result of the work of these committees, the State Library has contracted with King Research, Inc., to study the feasibility of establishing and operating a statewide library network for North Carolina by identifying the potential functions of such a network, the products and services to be derived from it, and the probable costs of the appropriate network approaches. The purposes of the study are:

1. To assist the library community in arriving at a consensus on the functions, priorities, and structure of a statewide network.

2. To identify the potential benefits of a statewide library network as a basis for making recommendations to the Governor and to the General Assembly.

3. To propose a realistic incremental plan of action, identifying steps to be taken prior to actual network structure and design.

A statewide library network for North Carolina could take many forms and could provide many possible combinations of services and products. The decisions on which form to adopt and which services and products to initiate will be founded on the expressed needs and preferences of members of the library community across the State.

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[1]Smith, Alberta, Access to Information for North Carolinians: Multitype Library Cooperation, Working Paper No. 1, Division of State Library, N. C. Department of Cultural Resources, 1981.

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To learn about those needs and preferences, several hearings are being held to which all interested persons are invited. In addition, written comments may be sent to the State Library for forwarding to King Research or may be sent directly to:

Vernon E. Palmour
Project Director
King Research, Inc.
6000 Executive Blvd.
Rockville, MD 20852

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